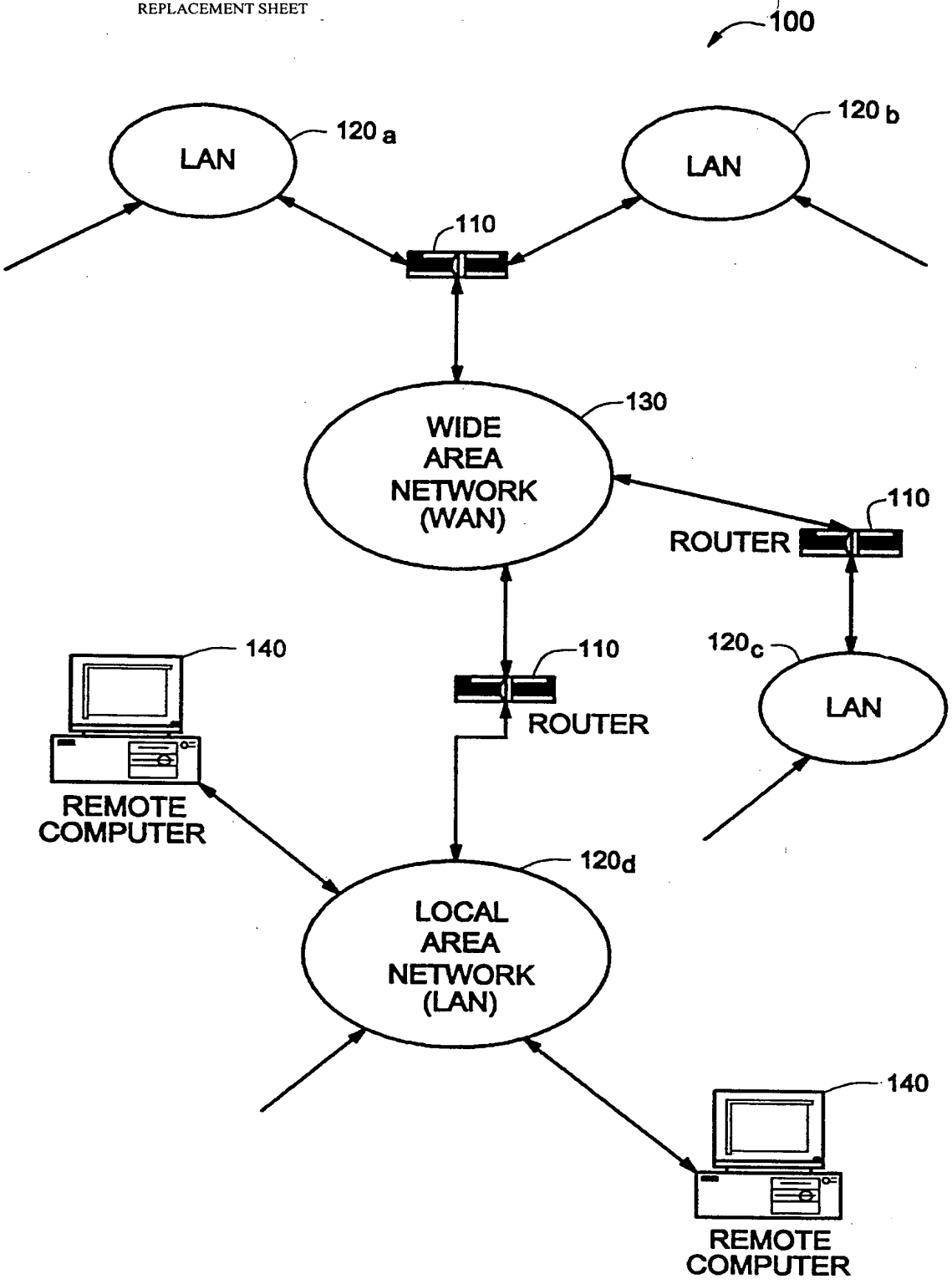


Figure 1

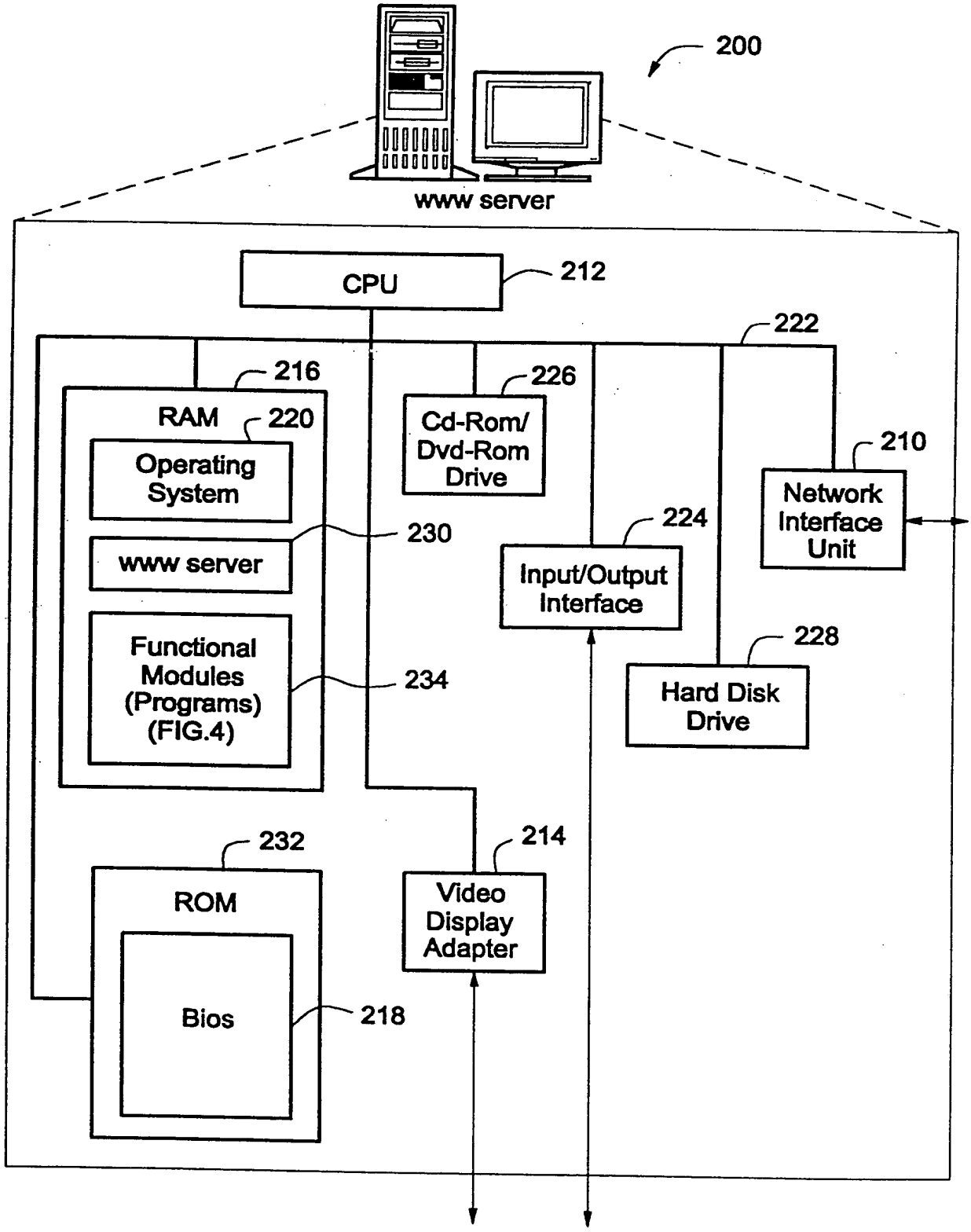

200
www server
CPU
212
222
216
RAM
220
Operating System
www server
230
Functional Modules (Programs) (FIG.4)
234
226
Cd-Rom/ Dvd-Rom Drive
224
Input/Output Interface
210
Network Interface Unit
228
Hard Disk Drive
232
ROM
Bios
218
214
Video Display Adapter

Figure 2

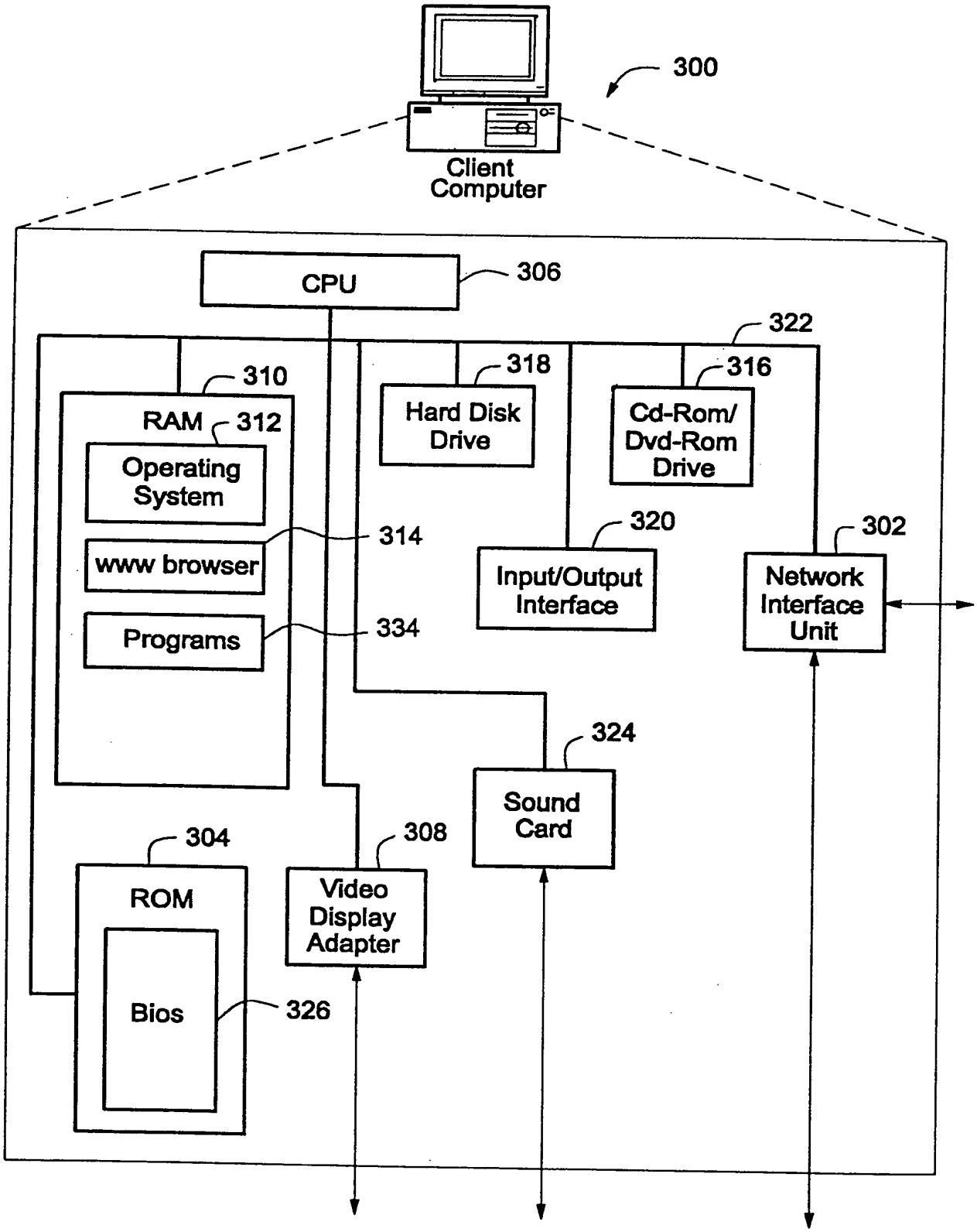

300
Client Computer
CPU
306
322
310
318
316
RAM
312
Hard Disk Drive
Cd-Rom/ Dvd-Rom Drive
Operating System
314
320
302
www browser
Input/Output Interface
Network Interface Unit
Programs
334
324
Sound Card
304
308
ROM
Video Display Adapter
Bios
326

Figure 3

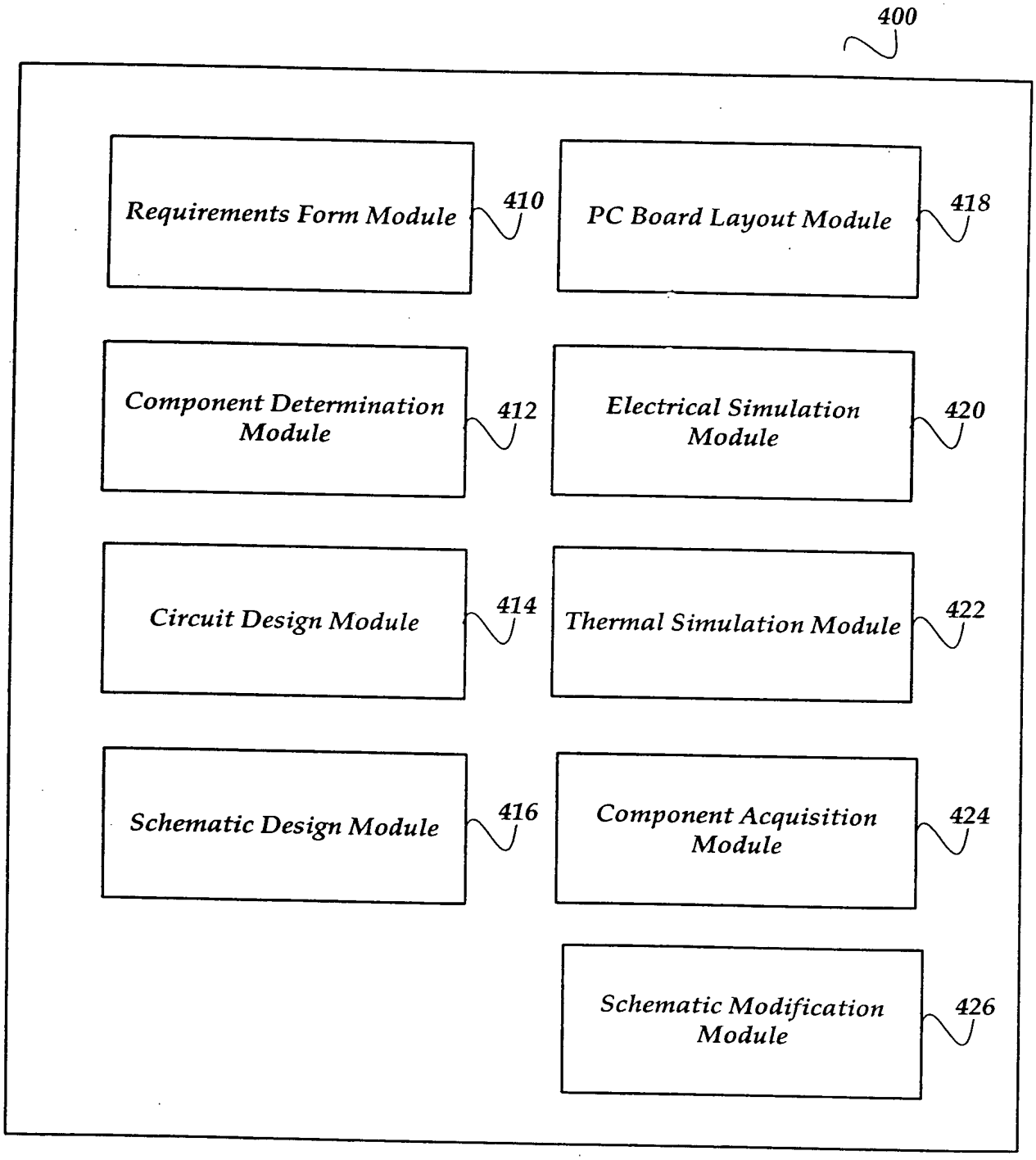

400
Requirements Form Module
410
PC Board Layout Module
418
Component Determination Module
412
Electrical Simulation Module
420
Circuit Design Module
414
Thermal Simulation Module
422
Schematic Design Module
416
Component Acquisition Module
424
Schematic Modification Module
426

Fig.4

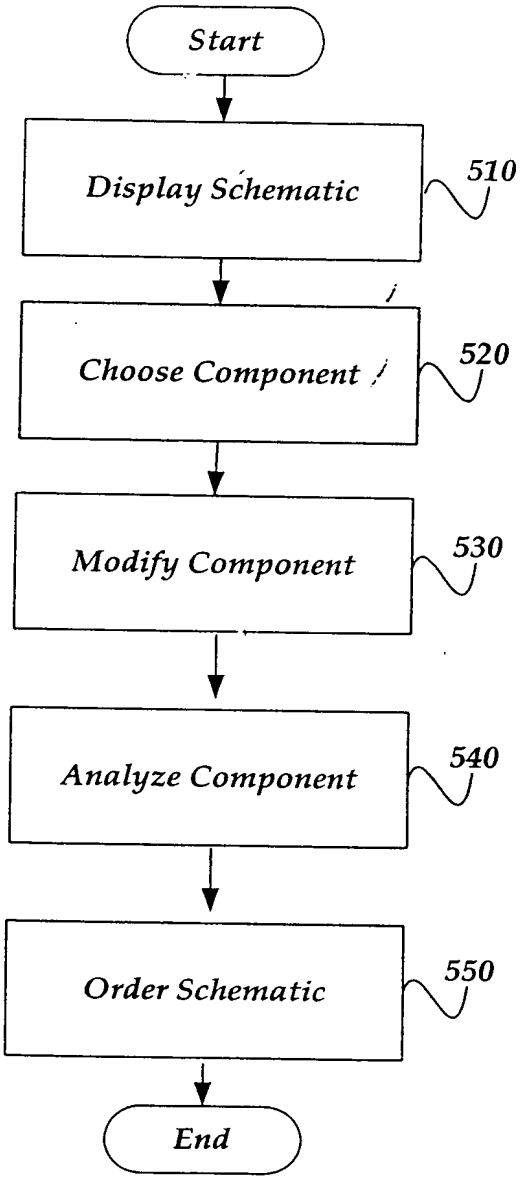
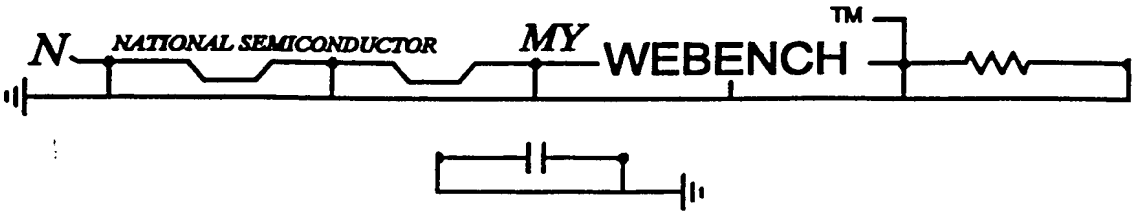

Start
Display Schematic
510
Choose Component
520
Modify Component
530
Analyze Component
540
Order Schematic
550
End

Fig.5



Welcome to your power Webench™!

"Tools for the power design engineer"

START HERE — 605
to design a power supply.

How to use Webench

Just four easy steps to design a power supply! Just click on the items below for help on that step.

610

620 — 1 Choose a Part — choose a specific part or input your system specifications to find those devices that fit.

630 — 2 Create a Design — a design will be created for you including any necessary passive components and important calculated operating values.

640 — 3 Analyze a Design — use WebSim™, the online power simulator, to validate your design electrically, and WebTHERM™, the online thermal simulator to visualize the thermal behavior of your design.

650 — 4 Build It! — buy a part, a kit of parts, or an evaluation board.

See Our Disclaimer

Features

WebSIM™, is a browser-based simulator which allows you to probe points in the

My Designs

Your Last 4 Designs:

- Design #6
- Design #5
- Design #4
- Design #3

660

670

MY Designs Shows all of your Designs

My WebSIM™ Simulations — 680

My WebTHERM™ Simulations — 690

My BuildIt Order — 695

Other Power Webench Tools

Switchers Made Simple™ is downloadable software that enables you to develop a complete power supply design on your local PC. This covers Simple Switcher devices and includes discrete component and manufacturer selection.

- SMS 6.1 (for LM267x and LM259x buck regulators, and LM258x and LM2577 boost & flyback regulators) updated!
- SMS 3.3 (for LM257X)

Wireless Webench Tools

- Wireless Easy PLL Design Assistant

Figure 6

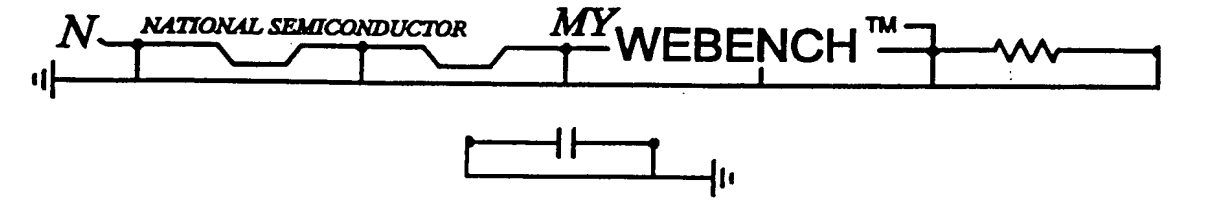
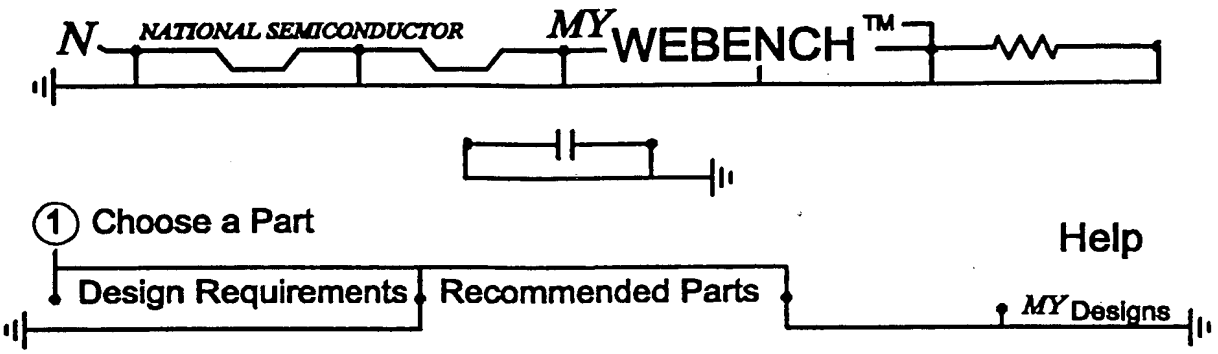

NATIONAL SEMICONDUCTOR
MY WEBENCH™
1 Choose a Part
Design Requirements
Recommended Parts
Help
MY Designs
Enter your power supply design requirements.
Basic Selections
Output Voltage
702
Vin Min 20 V
Vin Max 22 V
5 Volts
V out
I out
Output #1 5.0 V 5 A
704
Choose Additional Features (Optional)
706
On/Off Pin ○ No ○ Yes ◉ Ignore
Error Flag ○ No ○ Yes ◉ Ignore
Sync Pin ○ No ○ Yes ◉ Ignore
V out
I out
Output 2 V A
Output 3 V A
Show Recommended Power Management ICs
708
Quick Search
Parametric Search
See Our Disclaimer
Product Tree
Back to Webench
About Languages. Website Guide. About "Cookies". National is QS 9000 Certified
Site Terms & Conditions of Use. Copyright 2001 © National Semiconductor Corporation
Privacy/Security Statement. MY: Preferences. Feedback

Figure 7



Your Design Specifications

VinMin : 20.0 V VinMax : 22.0 V	Output #1 Vout = 5.00 V Iout = 5.00 A

Suggested Switching Regulators - Buck Topology

Product Folder	Webench Tools	Max Curr.	Typ. Eff.	On/ Off	Err. Pin	Other Features	Freq. kHz	Est. Price
LM2678-5.0	Create Design WebTHERM™ Enabled Build It - Custom Kit (806, 808)	5.0A	84%	Y	Y		260	$3.84
LM2678-ADJ	Create Design WebTHERM™ Enabled Build It - Custom Kit (800)	5.0A	84%	Y	Y	Adj. Vout	260	$3.84
LM2679-5.0	Create Design WebTHERM™ Enabled Build It - Custom Kit (806)	5.0A	84%	Y	Y	SoftStart, Adj. Peak Current limit	260	$4.07
804 LM2679-ADJ	Create Design WebTHERM™ Enabled Build It - Custom Kit (806)	5.0A	84%	Y	Y	SoftStart, Adj. Peak Current Limit, Adj. Vout	260	$4.07

802

Figure 8A

Suggested Switching Regulators - Flyback Topology

Product Folder	Webench Tools	Max Curr.	Typ. Eff.	On/ Off	Err. Pin	Other Features	Freq. kHz	Est. Price
LM2585-5.0	Create Design	3.0A	93%	N	N	SoftStart	100	$3.42
LM2585-ADJ	Create Design	3.0A	80%	N	N	SoftStart, Adj. Vout	100	$3.42
LM2586-5.0	Create Design	3.0A	80%	Y	N	Sync, SoftStart	100	$3.45
LM2586-ADJ	Create Design	3.0A	80%	Y	N	Sync, SoftStart, Adj. Vout	100	$3.45
LM2587-5.0	Create Design	5.0A	80%	N	N	SoftStart	100	$4.51
LM2587-ADJ	Create Design	5.0A	80%	N	N	SoftStart, Adj. Vout	100	$4.51
LM2588-5.0	Create Design	5.0A	80%	Y	N	Sync, SoftStart	100	$4.61
LM2588-ADJ	Create Design	5.0A	80%	Y	N	Sync, SoftStart, Adj. Vout	100	$4.61
LM2577-ADJ	Create Design	3.0A	80%	N	N	SoftStart, Adj. Vout	52	$3.15

Figure 8B

Products > Analog - Regulators > Simple Switchers > LM2679

Product Folder

905

Live Simulation

Buy LM2679-5.0 Evaluation Board

LM2679 SIMPLE SWITCHER 5A Step-Down Voltage Regulator with Adjustable Current Limit

Generic P/N 2679

Contents

902

- General Description
- Features
- Applications
- Datasheet
- Package Availability, Models, Samples & Pricing
- Design Tools

Parametric Table	
Multiple Output Capability	No
On/Off Pin	Yes
Error Flag	Yes
Input Voltage, min (Volt)	8, 15
Input Voltage, max (Volt)	40
Output Current, max	5 Amps
Output Voltage (Volt)	5, 12, 3.30
Adjustable Output Voltage	No, Yes
Switching Frequency (Hz)	260000
Adjustable Switching Frequency	No
Sync Pin	No
Efficiency (%)	84, 92, 82
Flyback	No
Step-up	No
Step-down	Yes

904

Figure 9

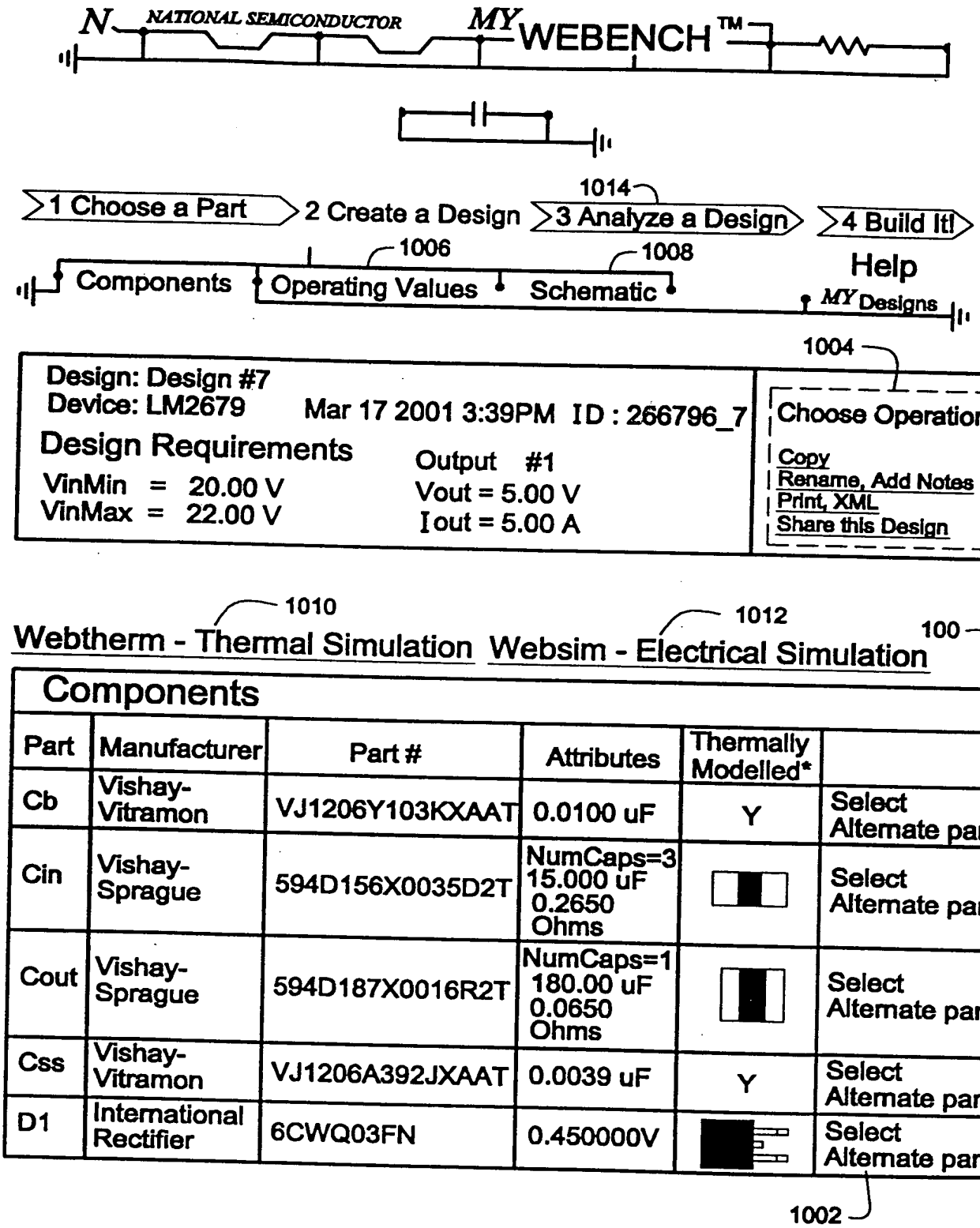
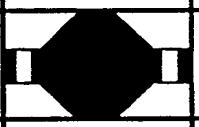
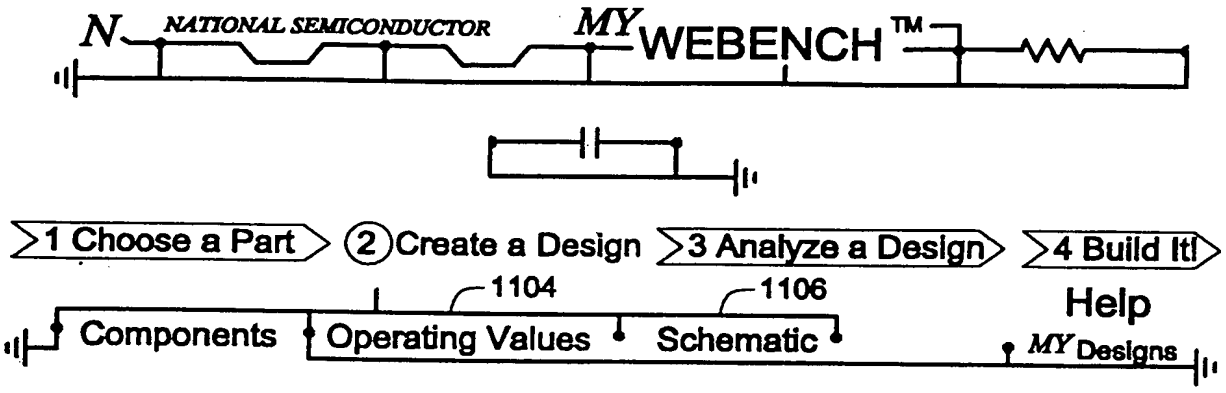

NATIONAL SEMICONDUCTOR
MY WEBENCH™
1 Choose a Part
2 Create a Design
1014
3 Analyze a Design
4 Build It!
1006
1008
Components
Operating Values
Schematic
Help
MY Designs
1004
Design: Design #7
Device: LM2679
Mar 17 2001 3:39PM ID : 266796_7
Design Requirements
VinMin = 20.00 V
VinMax = 22.00 V
Output #1
Vout = 5.00 V
Iout = 5.00 A
Choose Operation
Copy
Rename, Add Notes
Print, XML
Share this Design
1010
Webtherm - Thermal Simulation
1012
Websim - Electrical Simulation
100
Components
Part
Manufacturer
Part #
Attributes
Thermally Modelled*
Cb
Vishay-Vitramon
VJ1206Y103KXAAT
0.0100 uF
Y
Select Alternate part
Cin
Vishay-Sprague
594D156X0035D2T
NumCaps=3
15.000 uF
0.2650 Ohms
Select Alternate part
Cout
Vishay-Sprague
594D187X0016R2T
NumCaps=1
180.00 uF
0.0650 Ohms
Select Alternate part
Css
Vishay-Vitramon
VJ1206A392JXAAT
0.0039 uF
Y
Select Alternate part
D1
International Rectifier
6CWQ03FN
0.450000V
Select Alternate part
1002

Figure 10A

IC	National Semi-conductor	LM2679S-ADJ	ADJV,Buck		Select Alternate part
L1	Coiltronics	UP4B-150	15.000 uH, 0.0200 Ohms		Select Alternate part
Rfb1	Vishay-Dale	CRCW1206-1001FRT1	1000 Ohms	Y	Select Alternate part
Rfb2	Vishay-Dale	CRCW1206-3161FRT1	3160 Ohms	Y	Select Alternate part
Rilim	Vishay-Dale	CRCW1206-4991FRT1	4990 Ohms	Y	Select Alternate part

* Components marked "Y" are not required for Thermal Simulation.

Figure 10B



Design: Design #7
Device: LM2679 Mar 17 2001 3:39PM ID: 266796_7

Design Requirements

VinMin = 20.00 V
VinMax = 22.00 V

Output #1
Vout = 5.00 V
Iout = 5.00 A

Select Alternate for Component D1

Please select from the list of available alternates below. Click on the " Update BOM " buttom when you are done.

Update - BOM 1102

1108

Alternates	Part # Manufacturer	Thermally Modelled	Forward Voltage Drop	Max Rated Current	Max Voltage Rating	x,y,z in mm	Price	Quantity Available
Custom ○		N	Limit = 0.00 V	1110 Limit >= 5.00	1112 Limit >= 28.4			
1 ○	6CWQ03FN International Rectifier		0.45000V	7.000A	30.00V	10.42 6.73 2.38	$0.85	>10 in stock
2 ○	50WQ03FN International Rectifier		0.46000V	5.500A	30.00V	10.42 6.73 2.38	$1.83	>10 in stock
3 ○	12CWQ03-FNTRL International Rectifier		0.47000V	12.00A	30.00V	10.42 6.73 2.38	$0.82	>10 in stock
4 ○	50WQ04FN International Rectifier		0.51000V	5.500A	40.00V	10.42 6.73 2.38	$1.33	>10 in stock

Figure 11A

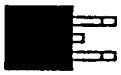
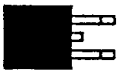
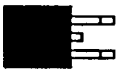
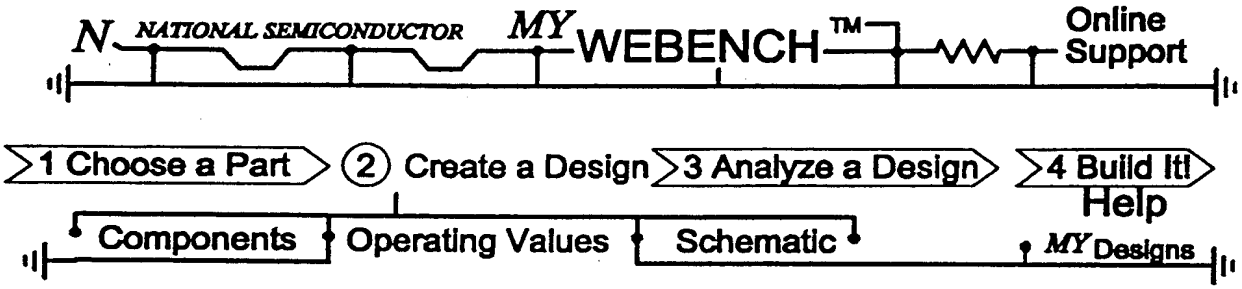
5 ⊙	12CWQ04FN International Rectifier		0.52000V	12.00A	40.00V	10.42 6.73 2.38	$1.48	>10 in stock
6 ○	6CWQ04FN International Rectifier		0.53000V	7.000A	40.00V	10.42 6.73 2.38	$1.00	>10 in stock
7 ○	50WQ06FN International Rectifier		0.57000V	5.500A	60.00V	10.42 6.73 2.38	$1.07	>10 in stock
8 ○	12CWQ06FN International Rectifier		0.61000V	12.00A	60.00V	10.42 6.73 2.38	$0.72	>10 in stock
9 ○	6CWQ06-FNTR International Rectifier		0.61000V	7.000A	60.00V	10.42 6.73 2.38	$1.08	>10 in stock

Figure 11B



Design: Design #7 Device: LM2679	Mar 17 2001 3:39:00:000PM	ID: 266796_7
Design Requirements VinMin = 20.00 V VinMax = 22.00 V	Output #1 Vout = 5.00 V Iout = 5.00 A	Choose Operation Copy Rename, Add Notes Print, XML Share this Design

Vin: 22.00 V I out 5.00 A SUBMIT

Operating Values

#	Description	Parameter	Value
1	Pulse Width Modulation (PWM) Frequency	Frequency	260 kHz
2	Continuous or Discontinuous Conduction Mode, inductor current goes to zero in Discontinuous Conduction	Mode	Cont
3	Total Output Power	Pout	25.0W
4	Vin operating point	Vin Op	22.00V
5	Iout operating point	Iout Op	5.00A

Operating Point at Vin = 22.00 V, 5.00 A

#	Description	Parameter	Value
1	Bode Plot Crossover Frequency, indication of bandwidth of supply	Cross Freq	97.7 kHz
2	Steady State PWM Duty Cycle, range limits from 0 to 100	Duty Cycle	25.8%
3	Steady State Efficiency	Efficiency	85.3%
4	IC Junction Temperature	IC Tj	120 °C
5	IC Junction to Ambient Thermal Resistance	ICThetaJA	34.9 °C/W
6	Bode Plot Phase Margin	Phase Marg	71.0 Deg
7	Peak-to-peak ripple voltage	Vout p-p	0.07 V

Figure 12A

Current Analysis			
#	Description	Parameter	Value
1	Input Capacitor RMS ripple current	Cin IRMS	2.2 A
2	Output Capacitor RMS ripple current	Cout IRMS	0.20 A
3	Peak Current in IC for Steady State Operating Point	IC Ipk	5.5 A
4	ICs Maximum rated peak current	IC Ipk Max	7.4 A
5	Average input current	Iin Avg	2.3 A
6	Inductor ripple current, peak-to-peak Value	L Ipp	1.1 A

Power Dissipation Analysis			
#	Description	Parameter	Value
1	Input Capacitor Power Dissipation	Cin Pd	0.43 W
2	Output Capacitor Power Dissipation	Cout Pd	0.0026 W
3	Diode Power Dissipation	Diode Pd	1.9 W
4	IC Power Dissipation	IC Pd	1.4 W
5	Inductor Power Dissipation	L Pd	0.50 W

Figure 12B

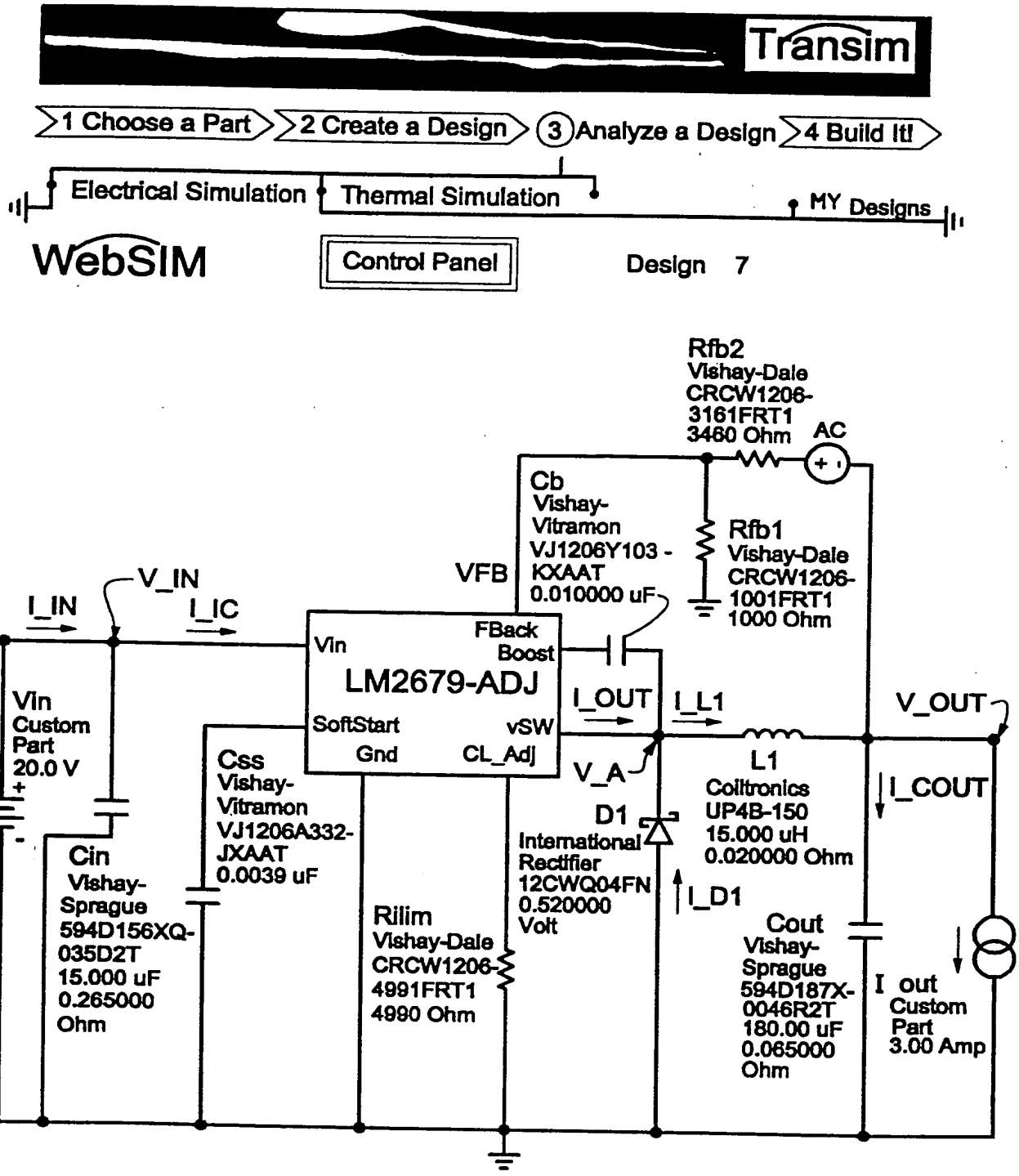

Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design 7
Rfb2
Vishay-Dale
CRCW1206-
3161FRT1
3460 Ohm
AC
Cb
Vishay-
Vitramon
VJ1206Y103 -
KXAAT
0.010000 uF
VFB
Rfb1
Vishay-Dale
CRCW1206-
1001FRT1
1000 Ohm
V_IN
I_IN
I_IC
Vin
FBack
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
I_OUT
I_L1
V_OUT
Vin
Custom
Part
20.0 V
Css
Vishay-
Vitramon
VJ1206A332-
JXAAT
0.0039 uF
V_A
L1
Coiltronics
UP4B-150
15.000 uH
0.020000 Ohm
I_COUT
D1
International
Rectifier
12CWQ04FN
0.520000
Volt
I_D1
Cin
Vishay-
Sprague
594D156XQ-
035D2T
15.000 uF
0.265000
Ohm
Rilim
Vishay-Dale
CRCW1206-
4991FRT1
4990 Ohm
Cout
Vishay-
Sprague
594D187X-
0046R2T
180.00 uF
0.065000
Ohm
I out
Custom
Part
3.00 Amp

Figure 13

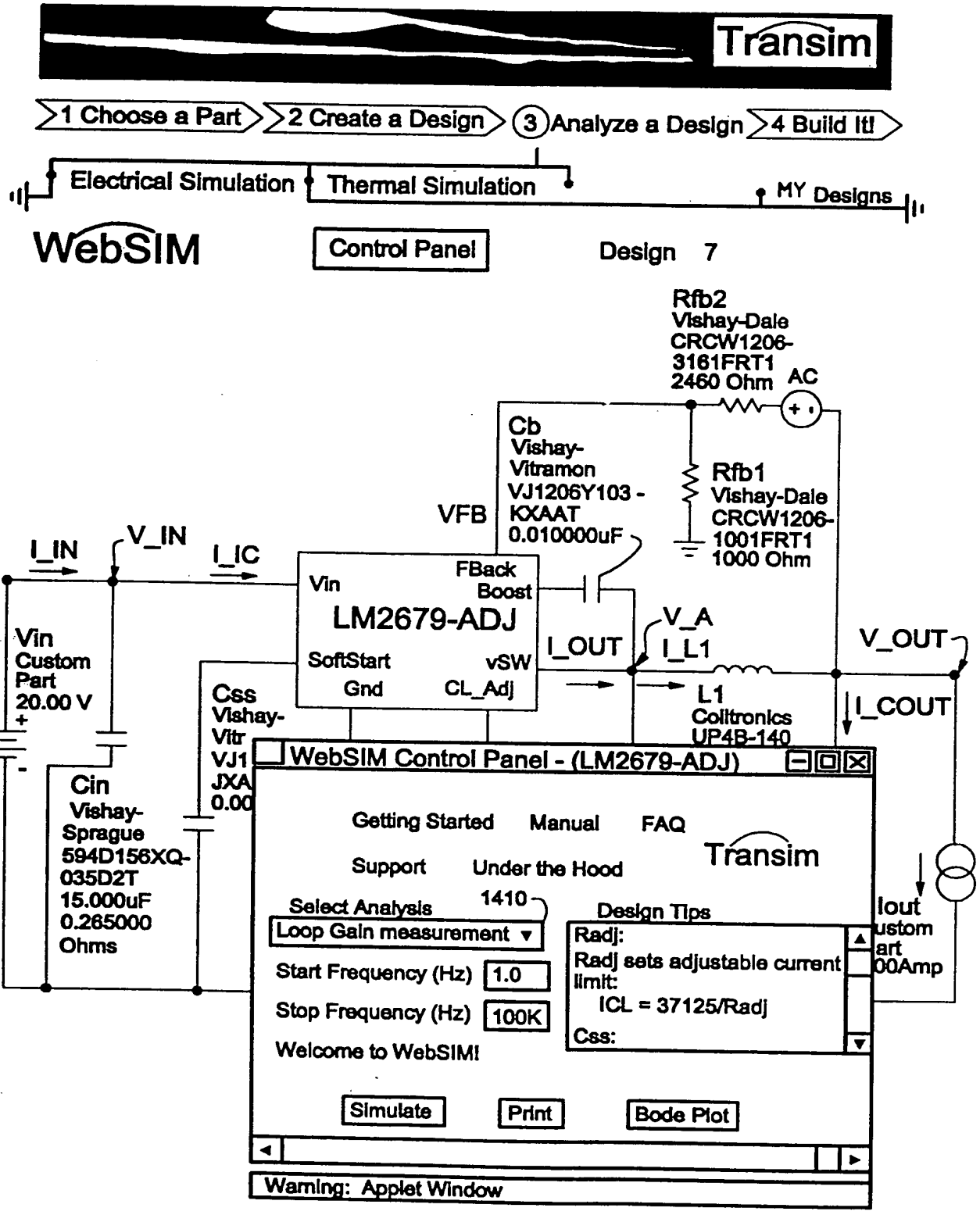
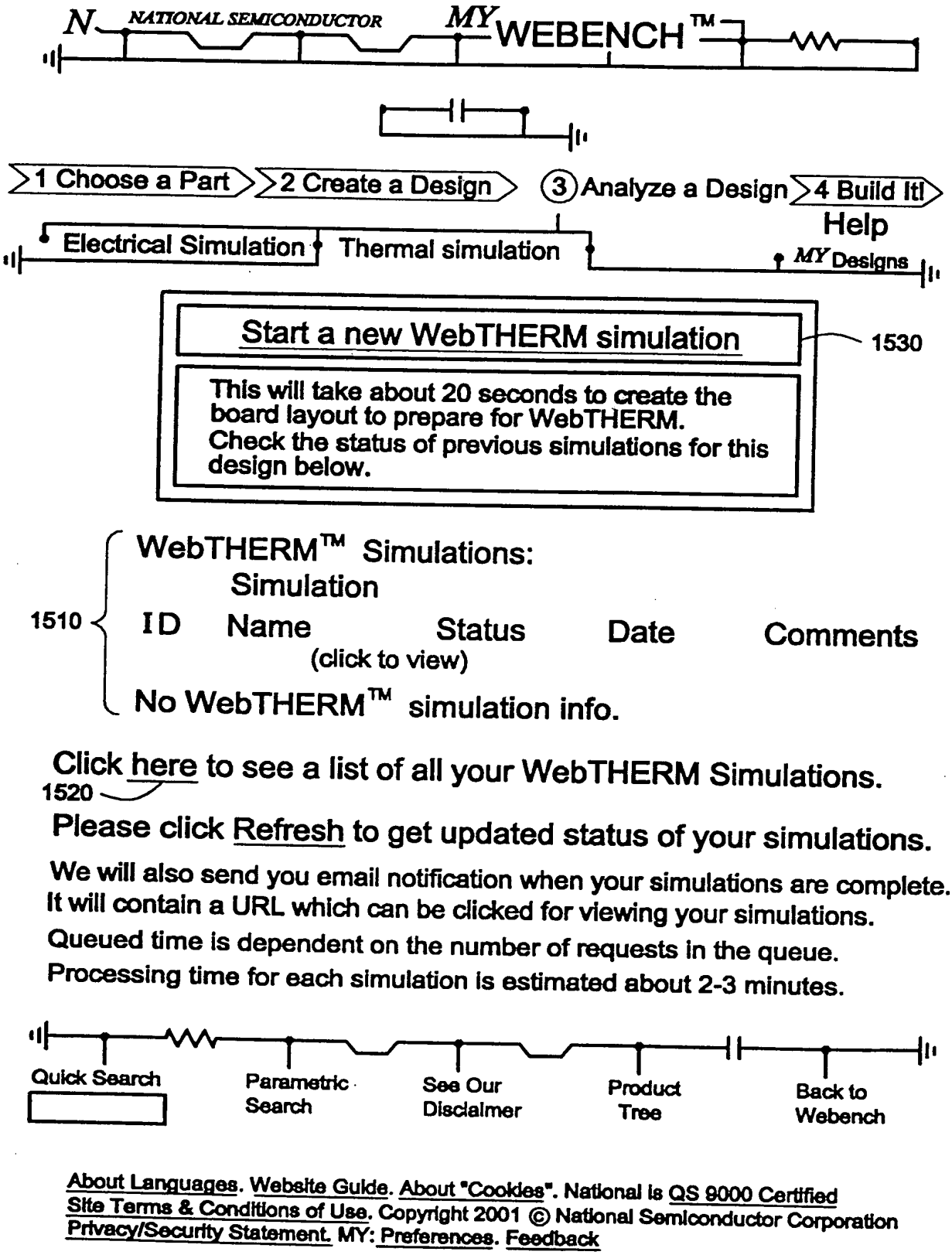

Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design 7
Rfb2
Vishay-Dale
CRCW1206-
3161FRT1
2460 Ohm
AC
Cb
Vishay-
Vitramon
VJ1206Y103 -
KXAAT
0.010000uF
Rfb1
Vishay-Dale
CRCW1206-
1001FRT1
1000 Ohm
VFB
I_IN
V_IN
I_IC
Vin
FBack
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
V_A
I_L1
I_OUT
V_OUT
I_COUT
Vin
Custom
Part
20.00 V
Css
Vishay-
Vitr
VJ1
JXA
0.00
L1
Coiltronics
UP4B-140
Cin
Vishay-
Sprague
594D156XQ-
035D2T
15.000uF
0.265000
Ohms
WebSIM Control Panel - (LM2679-ADJ)
Getting Started
Manual
FAQ
Transim
Support
Under the Hood
1410
Select Analysis
Loop Gain measurement
Design Tips
Radj:
Radj sets adjustable current limit:
ICL = 37125/Radj
Css:
Start Frequency (Hz)
1.0
Stop Frequency (Hz)
100K
Welcome to WebSIM!
Simulate
Print
Bode Plot
Warning: Applet Window
Iout
ustom
art
00Amp

Figure 14


NATIONAL SEMICONDUCTOR
MY WEBENCH™
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
Electrical Simulation
Thermal simulation
MY Designs
Start a new WebTHERM simulation
1530
This will take about 20 seconds to create the board layout to prepare for WebTHERM. Check the status of previous simulations for this design below.
1510
WebTHERM™ Simulations:
Simulation ID
Name (click to view)
Status
Date
Comments
No WebTHERM™ simulation info.
Click here to see a list of all your WebTHERM Simulations.
1520
Please click Refresh to get updated status of your simulations.
We will also send you email notification when your simulations are complete. It will contain a URL which can be clicked for viewing your simulations.
Queued time is dependent on the number of requests in the queue.
Processing time for each simulation is estimated about 2-3 minutes.
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Parametric Search
See Our Disclaimer
Product Tree
Back to Webench
About Languages. Website Guide. About "Cookies". National is QS 9000 Certified Site Terms & Conditions of Use. Copyright 2001 © National Semiconductor Corporation Privacy/Security Statement. MY: Preferences. Feedback

Figure 15

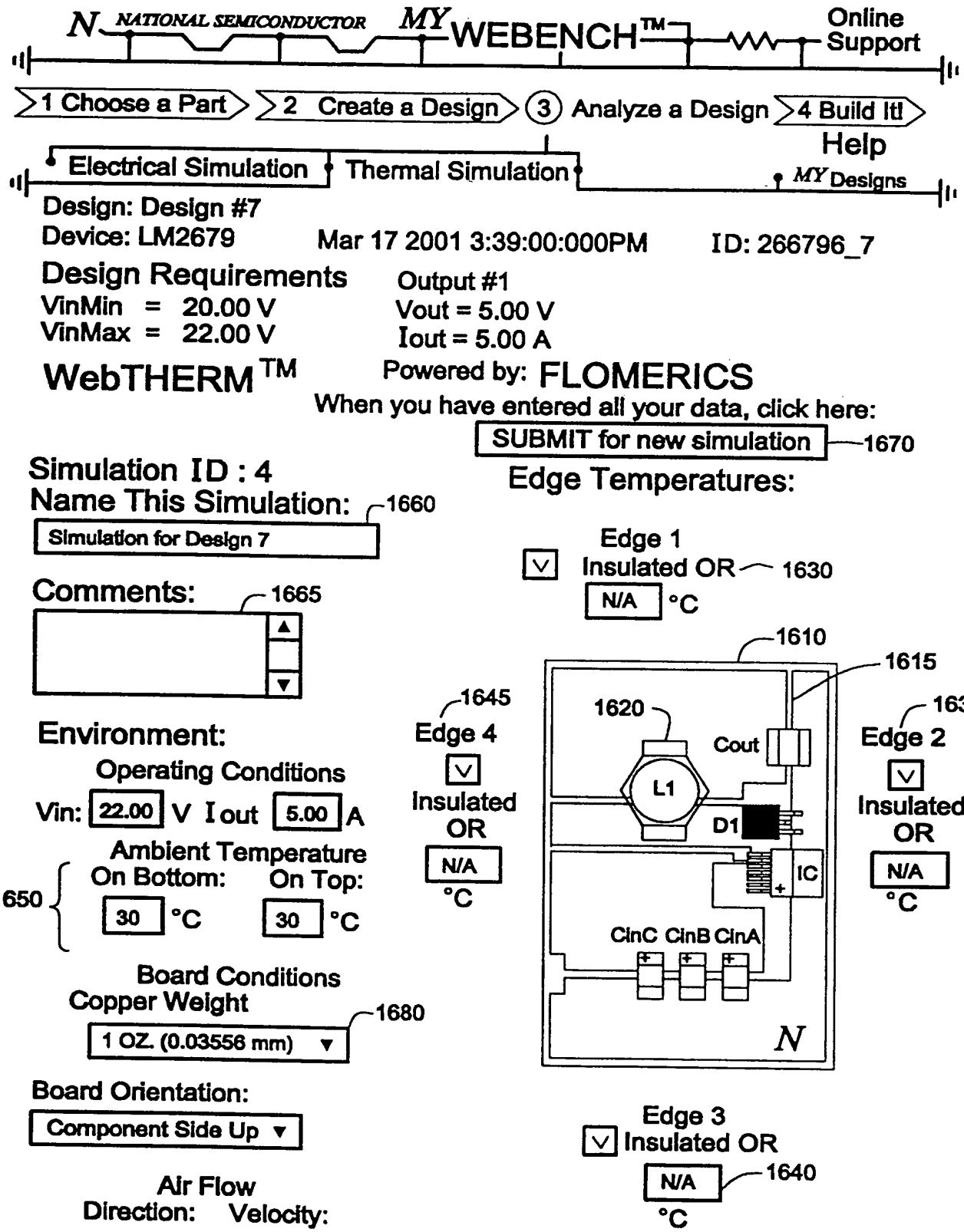
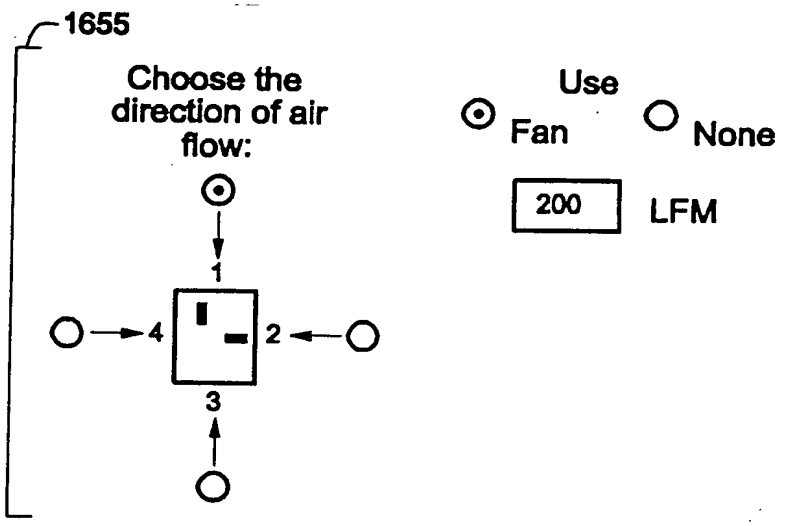

NATIONAL SEMICONDUCTOR
MY WEBENCH™
Online Support
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
Electrical Simulation
Thermal Simulation
MY Designs
Design: Design #7
Device: LM2679
Mar 17 2001 3:39:00:000PM
ID: 266796_7
Design Requirements
VinMin = 20.00 V
VinMax = 22.00 V
Output #1
Vout = 5.00 V
Iout = 5.00 A
WebTHERM™
Powered by: FLOMERICS
When you have entered all your data, click here:
SUBMIT for new simulation
1670
Simulation ID : 4
Name This Simulation:
1660
Simulation for Design 7
Comments:
1665
Environment:
Operating Conditions
Vin: 22.00 V Iout 5.00 A
Ambient Temperature
On Bottom: 30 °C
On Top: 30 °C
1650
Board Conditions
Copper Weight
1 OZ. (0.03556 mm)
1680
Board Orientation:
Component Side Up
Air Flow
Direction: Velocity:
Edge Temperatures:
Edge 1
Insulated OR
1630
N/A °C
1610
1615
1620
Cout
L1
D1
IC
ClnC ClnB ClnA
1645
Edge 4
Insulated OR
N/A °C
1635
Edge 2
Insulated OR
N/A °C
Edge 3
Insulated OR
N/A
1640
°C

Figure 16A



BOM			
Component	Power Dissipation	Manufacturer	Part#
Cin	0.43 W	Vishay-Sprague	594D156X0035D2T
Cout	0.0026 W	Vishay-Sprague	594D187X0016R2T
D1	1.9 W	International Rectifier	12CWQ04FN
IC	1.4 W	National Semiconductor	LM2679
L1	0.50 W	Coiltronics	UP4B-150

Design Assistant Messages

All components fit!

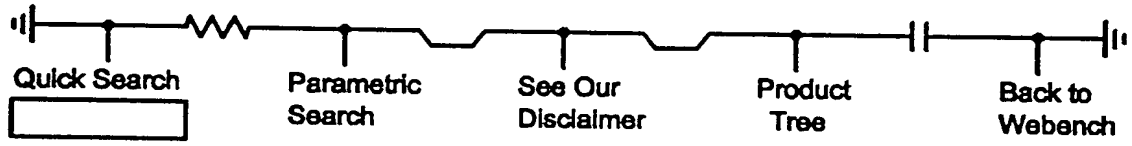


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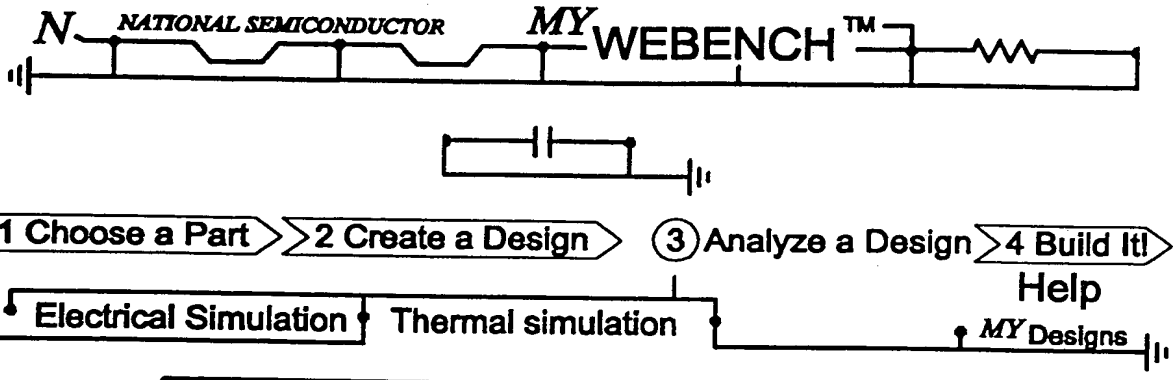
Figure 16B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(click to view)
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Design ID : 7
1
Simulation for Design 7
queued
Mar 17 2001 5 : 05 : 45 PM
1710
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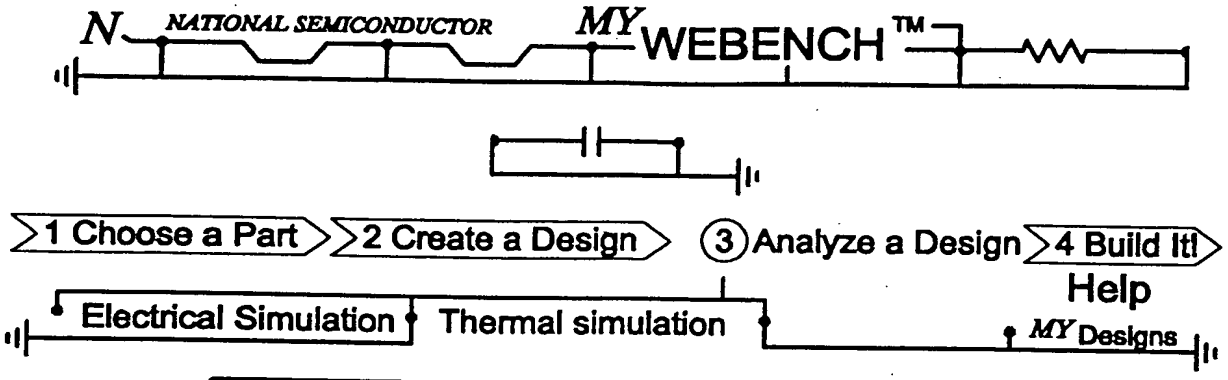
Figure 17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Name
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Simulations for Design ID : 7
Design ID : 7
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Simulation for Design 7
Processing
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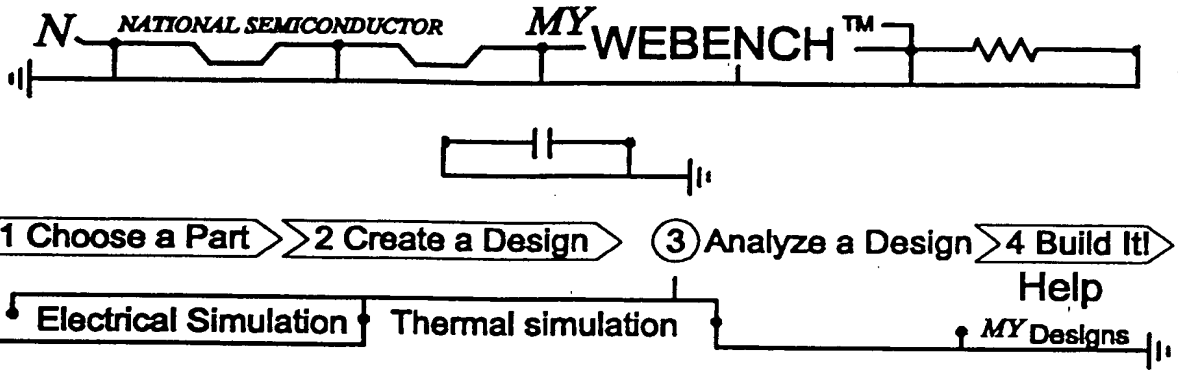
Figure 18



Start a new WebTHERM simulation

This will take about 20 seconds to create the board layout to prepare for WebTHERM. Check the status of previous simulations for this design below.

WebTHERM™ Simulations :

ID	Simulation Name (click to view)	Status	Date	Comments
7 = Design ID		Simulations for Design D : 7		Design ID : 7
1	Simulation for Design 7	Completed	Mar 17 2001 5 : 10 : 22 PM	

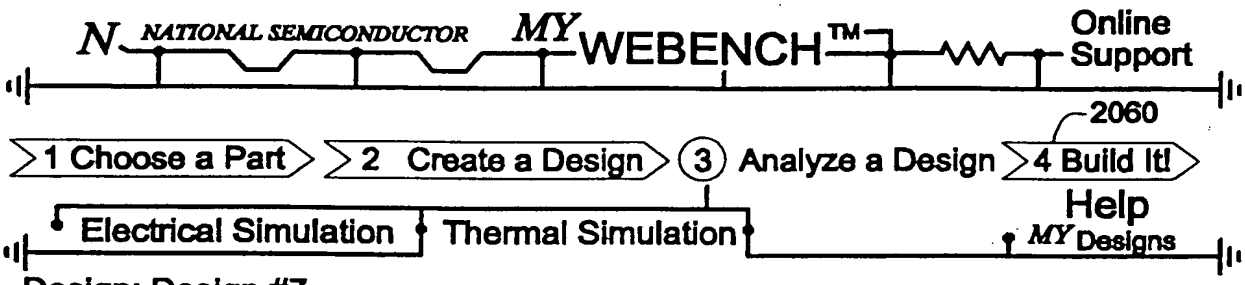
Please click Refresh to get updated status of your simulations.

We will also send you email notification when your simulations are complete, It will contain a URL which can be clicked for viewing your simulations.

Queued time is dependent on the number of requests in the queue.

Processing time for each simulation is estimated about 2-3 minutes.

Figure 19



Design: Design #7
Device: LM2679 Mar 17 2001 3:39:00:000PM I D: 266796_7

Design Requirements
VinMin = 20.00 V
VinMax = 22.00 V

Output #1
Vout = 5.00 V
Iout = 5.00 A

WebTHERM™

Powered by: Download Flomerics SMARTPART™ model
FLOMERICS

Simulation ID : 1
Name This Simulation:
Simulation for Design 7

Do another simulation — 2050

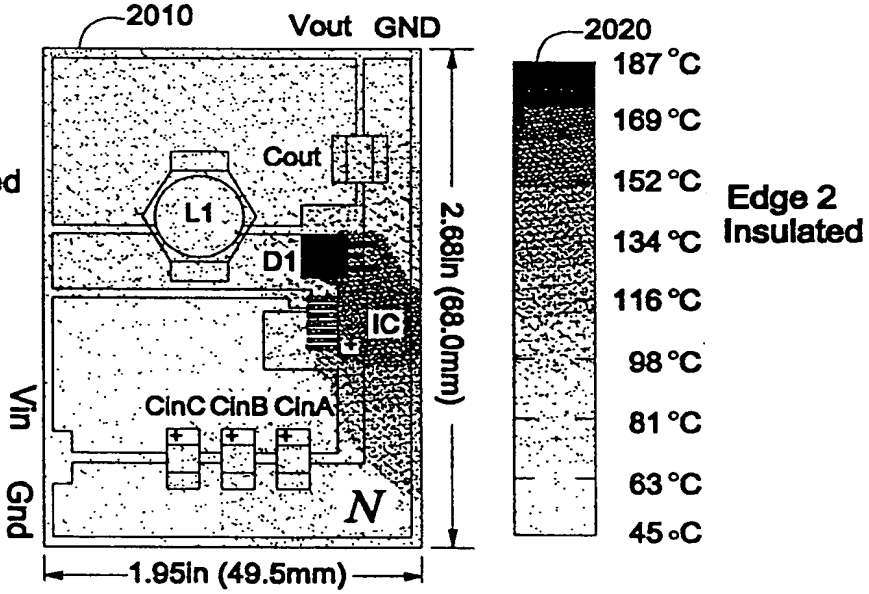
Edge Temperatures:

Edge 1 Insulated

Environment:

Operating Conditions
Vin: 22.00 V
Iout: 5.00A

Edge 4 Insulated



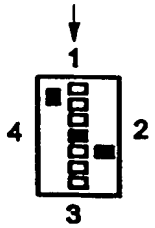
Edge 2 Insulated

Ambient Temperature
On Bottom: 30 °C
On Top: 30 °C

Board Conditions
Copper Weight
0.5 OZ. (0.01778 mm)

Board Orientation
Component Side Up

Air Flow Direction Velocity: No Fan



Edge 3 Insulated

Temperature Bar Scaling

Click here to recolor your thermal image.

Max Colorbar Temperature 188 °C
Min Colorbar Temperature 46 °C
2040

Figure 20A

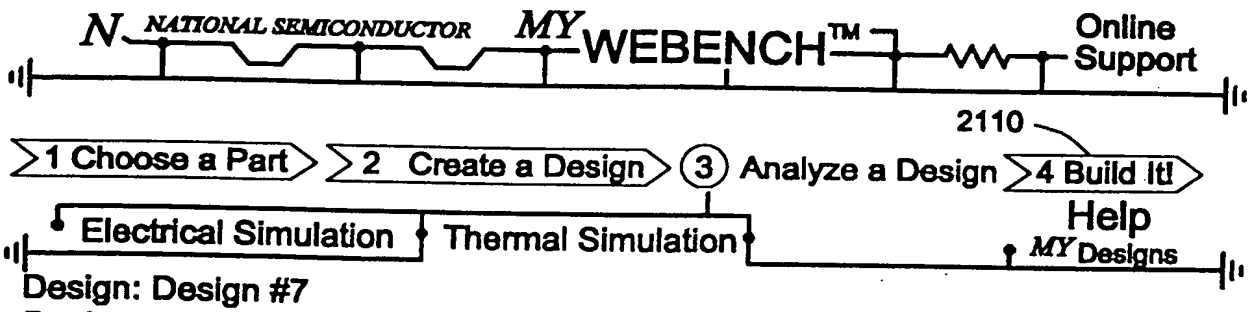
2030

Operating Temperatures				
Layer	Max Temp.	Manufacturer	Part #	Warnings
Cin	82 °C	Vishay-Sprague	594D156X0035D2T	
Cout	92 °C	Vishay-Sprague	594D187X0016R2T	
D1 - Diode	188 °C	International Rectifier	12CWQ04FN	
IC - Die	174 °C	National Semiconductor	LM2679	There is some potential problem with this design
IC - Top	165 °C			
L1 - Inductor	82 °C	Coiltronics	UP4B-150	
PCB	182 °C			

Design Assistant Messages

All components fit!

Figure 20B



Design: Design #7
Device: LM2679
Mar 17 2001 3:39:00:000PM
ID: 266796_7

Design Requirements

VinMin = 20.00 V
VinMax = 22.00 V

Output #1
Vout = 5.00 V
Iout = 5.00 A

WebTHERM™

Powered by: FLOMERICS

Download Flomerics SMARTPART™ model

Simulation ID : 3
Name This Simulation:
Simulation for Design 7

Do another simulation

Environment:

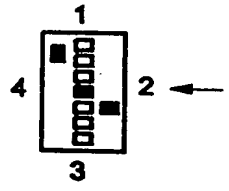
Operating Conditions
Vin: 22.00 V
Iout: 5.00A

Ambient Temperature
On Bottom: 30 °C
On Top: 30 °C

Board Conditions
Copper Weight
0.5 OZ. (0.01778 mm)

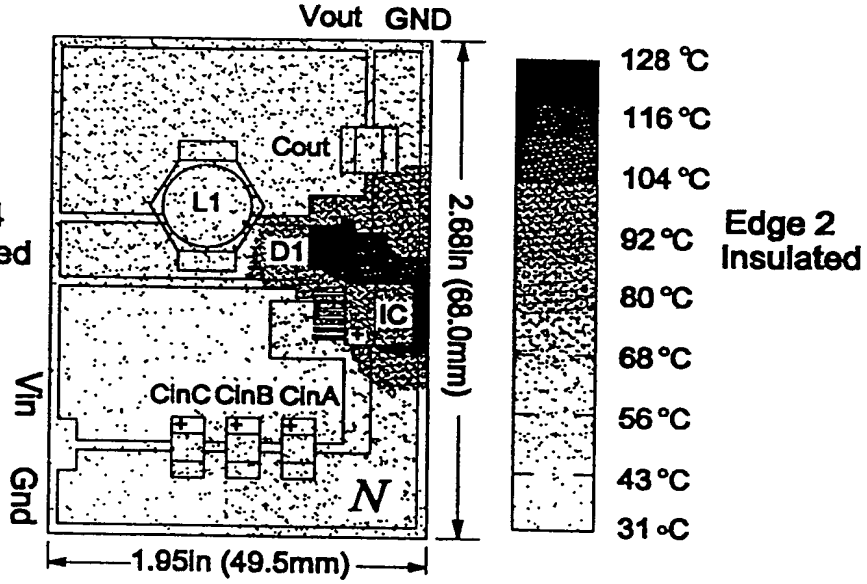
Board Orientation:
Component Side Up

Air Flow Direction Velocity:
of Air flow: 400LFM



Edge Temperatures:

Edge 1 Insulated



Edge 4 Insulated

Edge 2 Insulated

Edge 3 Insulated

Temperature Bar Scaling

Click here to recolor your thermal image.

Max Colorbar Temperature 128 °C

Min Colorbar Temperature 32 °C

Figure 21A

Operating Temperatures				
Layer	Max Temp.	Manufacturer	Part #	Warnings
Cin	50 °C	Vishay-Sprague	594D156X0035D2T	
Cout	50 °C	Vishay-Sprague	594D187X0016R2T	
D1 - Diode	128 °C	International Rectifier	12CWQ04FN	
IC - Die	112 °C	National Semiconductor	LM2679	There is some potential problem with this design.
IC - Top	97 °C			
L1 - Inductor	46 °C	Coiltronics	UP4B-150	
PCB	123 °C			

Design Assistant Messages

All components fit

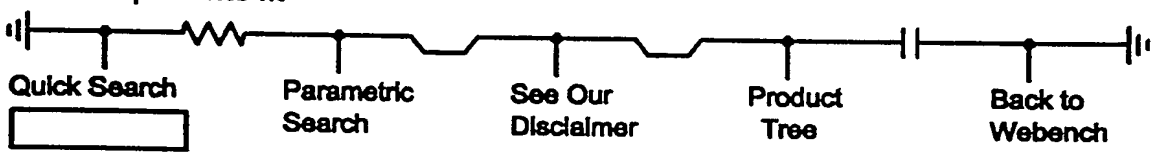
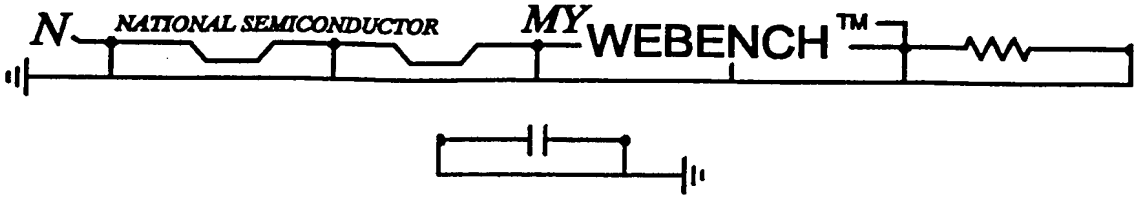


Figure 21B



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If for some reason you decide not to order the Custom Evaluation Kit you can always order only the IC from us here.

Custom Evaluation Kit

Bill of Materials

2220 2230

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Item	Manufacturer Part	Qty	Attributes	Component Name(s)	Pioneer Price	Pioneer Availability
1	International Rectifier 12CWQ04FN 	1	VFatio = 0.52 V	D1	$1.48	> 10 in Stock
2	Keystone 5015	4		TP1, TP2, TP3, TP6	$0.20	> 10 in Stock
3	National Semiconductor 551011367-011	1	Surface Mount, etc	PC Board	$5.00	> 10 in Stock
4	Vishay-Sprague 594D156X0035D2T 	3	Cap=15uF ESR= 0.265 Ohms	Cin	$1.00	> 10 in Stock
5	Vishay-Sprague 594D187X0016R2T 	1	Cap=180uF ESR= 0.065 Ohms	Cout	$1.00	> 10 in Stock

Figure 22A

6	Vishay-Dale CRCW1206-1001FRT1	1	Resistance =1000 Ohms	Rfb1	$0.03	> 10 in Stock
7	Vishay-Dale CRCW1206-3161FRT1	1	Resistance =3160 Ohms	Rfb2	$0.03	> 10 in Stock
8	Vishay-Dale CRCW1206-4991FRT1	1	Resistance =4990 Ohms	Rilim	$0.03	> 10 in Stock
9	National Semiconductor LM2679S-ADJ	1	Package=S, Voltage option=ADJ, Topology= Buck	IC	$4.75	> 10 in Stock
10	Coiltronics UP4B-150	1	L = 15uH DCR = 0.02 Ohms	L1	$1.50	> 10 in Stock
11	Vishay-Vitramon VJ1206A392JXAAT	1	Cap = 0.0039uF	Css	$0.05	> 10 in Stock
12	Vishay-Vitramon VJ1206Y103KXAAT	1	Cap = 0.01uF	Cb	$0.05	> 10 in Stock
13	Vishay-Vitramon VJ1206Y104KXAAT	1		Cinx	$0.05	> 10 in Stock
				Total	$17.77	

Bill of Materials | View Assembly Doc | Order this Kit from Pioneer-Standard >>

Order the IC

- Order the LM2679S-ADJ in volume
- Order a Free Sample

Generic Eval Board for LM2679

- Buy Eval Board for LM2679
- Download Protel File (See Notes Below)

The Protel files are saved as Self Extracting Zip Archives. To download a product's Protel file, click on the corresponding "Protel file now" link, and save the link as a file on your computer. Then run the file on your computer (double click). This will automatically decompress the Protel file to your computer's disk.
Note: You must have Protel software or other software that can read Protel PCB layout files in order to take advantage of these Protel files.

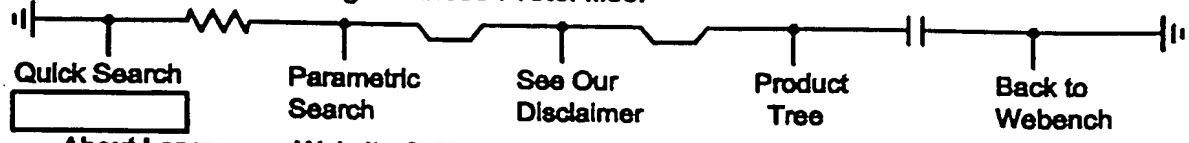
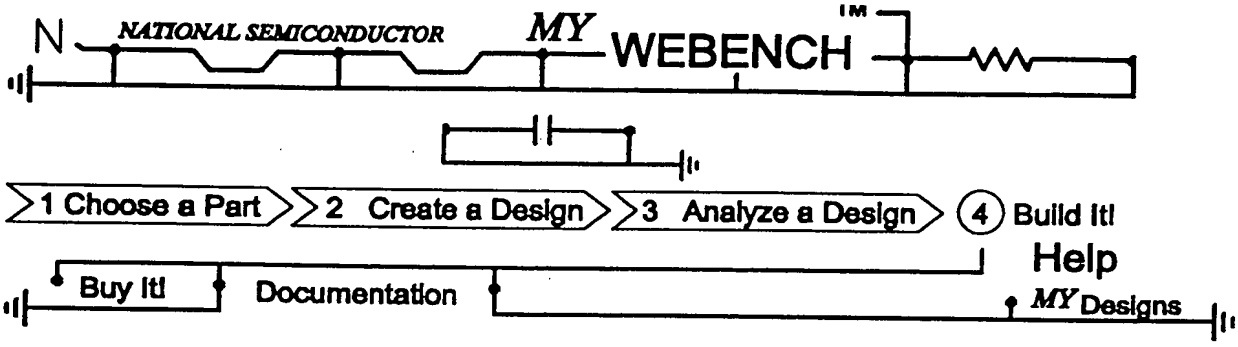


Figure 22B



Assembly Document for Your LM2679 Disign # : 7

LM2679 SMD Evaluation Board (LM2679BU1PWB)

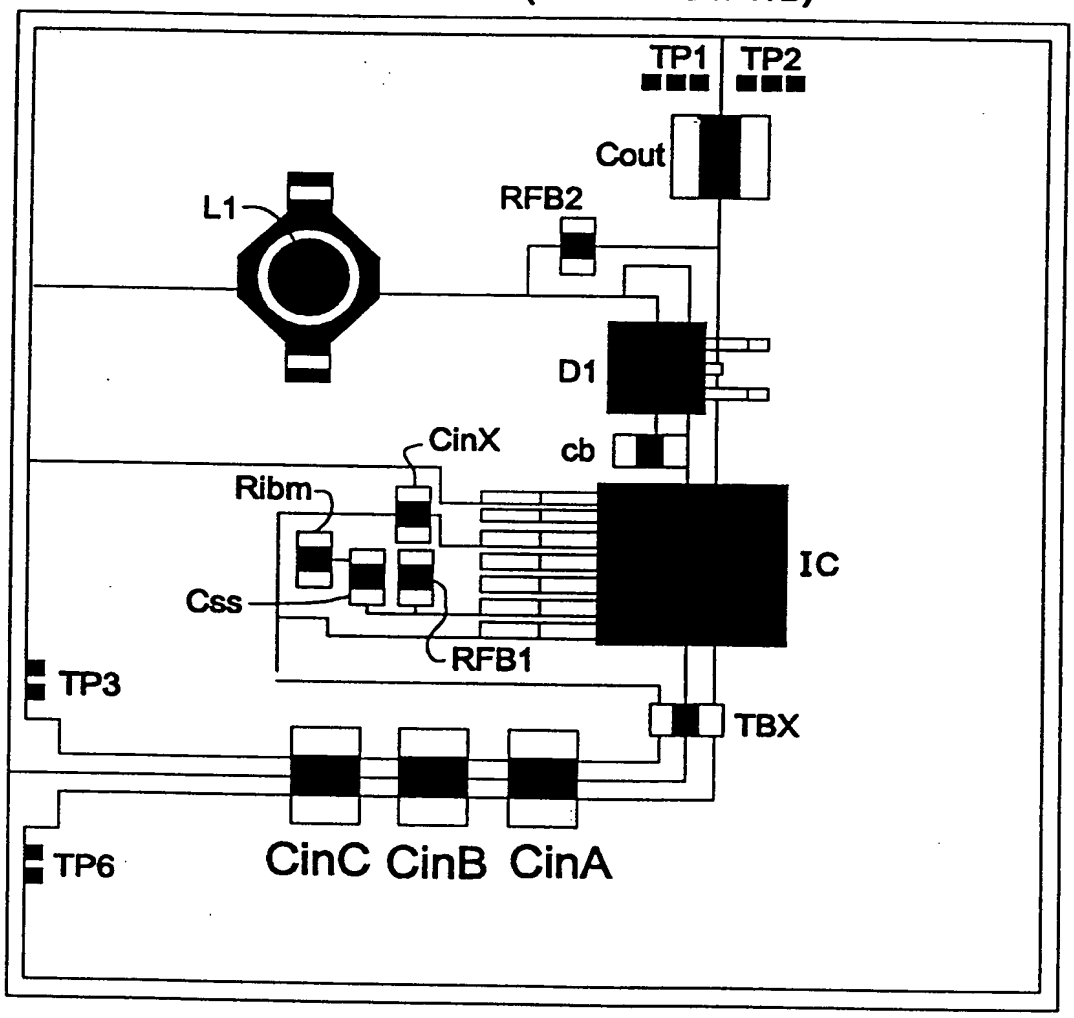


FIGURE 1 - Assembly Diagram

Download the Board Layout in Protel format.

GENERAL DESCRIPTION

Figure 23A

The LM2679 SMD Evaluation Board is designed to provide a flexible PCB platform for customers to develop and test custom power supply designs using tools avalable on the POWER.NATIONAL.COM website. The LM2679BU1PWB is a single sided surface mount layout using 1 oz copper. The overall board dimensions are 2.475" x 2.700" All components are mounted on the topside copper. WEBENCH™ has automatically placed the components on this board to make sure that the input capacitor Cin (and Cinx) and the diode D1 are as close to the IC as is reasonable minimizing stray circuit inductance. L1 and Cout should also be as close to the IC as reasonable but mostly to minimize the overall dimensions of the required PCB area for the power supply.

The LM2679 SMD Evaluation Board consists of a single layer PCB layout providing major landing areas on the PCB for the power conversion components: Inductor, Diode, Input and Output Capacitors as well as parameter setting small signal passive (resistors and capacitors) in 1206 packages and surface mount test points. Some components are optional or specific to an application, these are highlighted in the schematic. The PCB layout can be optimized for a specific design and lends itself to be dimensionally scalable (i.e. your particular design may have unused board area that can be "cut out" in the final application. This topic is covered in the PCB Layout Optimization section.

Bill of Materials (BOM).

Item	Manufacturer Part	Qty	Attributes	Component Name(s)
1	International Rectifier 12CWQ04FN 	1	VFatio = 0.52 V	D1
2	Keystone 5015	4		TP1, TP2, TP3, TP6
3	National Semiconductor 551011367-011	1	Surface mount, etc	PC Board
4	Vishay-Sprague 594D156X0035D2T 	3	Cap=15uF ESR=0.265 Ohms	Cin
5	Vishay-Sprague 594D187X0016R2T 	1	Cap=180uF ESR=0.065 Ohms	Cout

Figure 23B

6	Vishay-Dale CRCW1206-1001FRT1 	1	Resistance = 1000 Ohms	Rfb1
7	Vishay-Dale CRCW1206-3161FRT1 	1	Resistance = 3160 Ohms	Rfb2
8	Vishay-Dale CRCW1206-4991FRT1 	1	Resistance = 4990 Ohms	Rilim
9	National Semiconductor LM2679S-ADJ	1	Package=S, Voltage option=ADJ Topology=Buck	IC
10	Coiltronics UP4B-150 	1	L = 15uH DCR = 0.02 Ohms	L1
11	Vishay-Vitramon VJ1206A392JXAAT 	1	Cap = 0.0039uF	Css
12	Vishay-Vitramon VJ1206Y103KXAAT 	1	Cap = 0.01uF	Cb
13	Vishay-Vitramon VJ1206Y104KXAAT 	1		Cinx

SCHEMATIC

The Schematic for the LM2679 is shown in FIGURE 2. U1, L1, D1, Cin and Cout are the basic power conversion components. Cinx as a high frequency bypass to the input to the LM2679. Rfb1, Rfb2, and Cf form the feedback network for the adjustable version of the LM2679. For Fixed output versions a zero Ohm resistor (jumper) should be used for Rfb2 (Rfb1 and Cf should be left off the board), this can be replaced by a copper trace as shown in the PCB Layout Optimization section. A space is reserved for a pull-down resistor, Ron, for the ON/OFF (Active low) pin, this may be desired if a Tri-State gate is driving this pin. Otherwise, if the ON/OFF pin is left floating, the LM2679 is normally ON.

Figure 23C

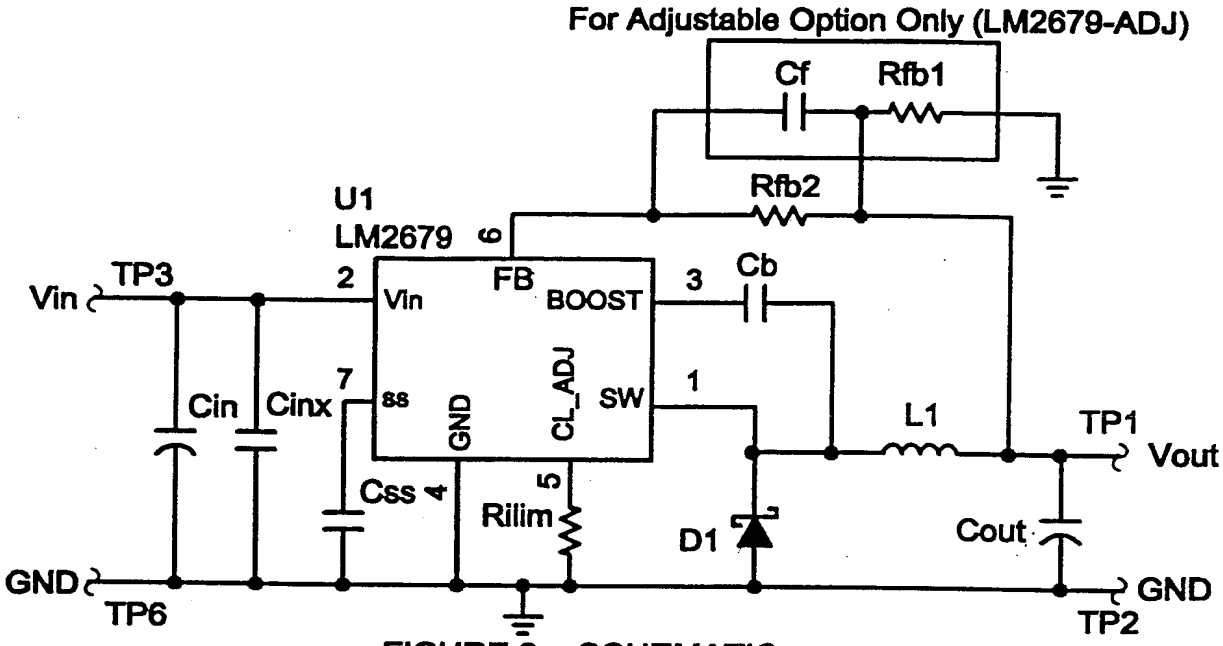


FIGURE 2. - SCHEMATIC

Download the Schematic file in Protel format.

Component Testing

Some published data on components in datasheets such as Capacitor ESR and Inductor DC resistance is based on conservative values that will guarantee that the components always exceed the specification. For design purposes it is usually better to work with typical values. Since this data is not always available it is a good practice to measure the Capacitance and ESR values of Cin and Cout, and the inductance and DC resistance of L1 before assembly of the board. Any large discrepancies in values should be electrically simulated to check for instabilities and thermally simulated to make sure critical temperatures are not exceeded.

Soldering Components to the Board

If board assembly is done in house it is best to track down one terminal on the board then solder the other terminal. For the LM2679 the tab on the back of the TO-263 package should be pre-tinned with solder, then tacked into place by one of the pins. To solder the tab down to the board place the iron down on the board while resting against the tab, heating both surfaces simultaneously. Apply light pressure to the top of the plastic case until the solder flows around the part and the part is flush with the PCB. If the solder is not flowing around the board you may need a higher wattage iron (generally 25W to 30W is enough).

Testing

It is best to power up the board by setting the supply voltage to the lowest operating input voltage (Vin min) and set the supplies current limit to zero. With the supply off connect up the supply to Vin and GND. Connect a DVM to Vout and GND. Turn on the supply and slowly turn up the current limit. It the voltage starts to rise on the supply continue increasing the current while watching the output voltage. If the current increases on the supply but the voltage remains near zero there may be a short or a component misplaced on the board. Power down the board and visually inspect for solder bridges and recheck the diode and capacitor polarities. Once the supply is operational then more extensive testing may include full load testing, transient load and line tests to compare with simulation results.

Figure 23D

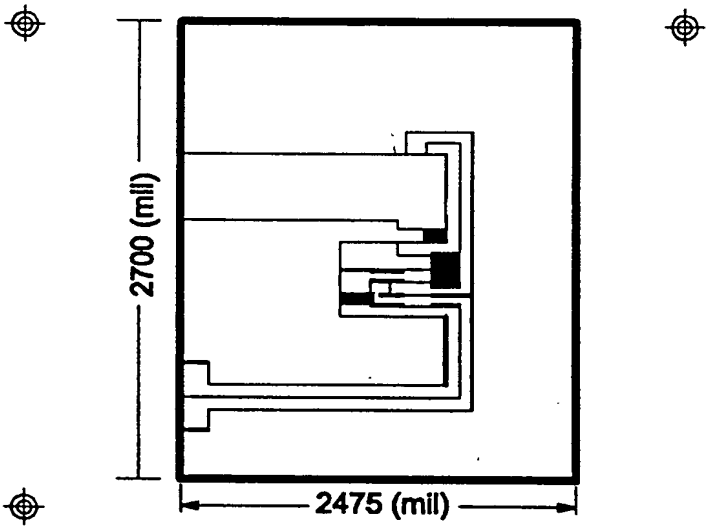
ARTWORK

FIGURE 3 shows the topside copper and FIGURE 4 shows the bottom side copper.

The intent of this board is to provide a flexible PCB layout to allow many different designs to be implemented using the same layout. In lower power designs you may find unused board space, that is not needed for electrical or thermal purposes. The overall layout lends itself to shrinking the design by trimming off the outer edges of the board.

Download the GERBER file for this PC Board.

NOTES: UNLESS OTHERWISE SPECIFICED
1. NO FAB SHOP LOGO < DATE CODE REQUIRED
2. APPLY GREEN (LPI) SOLDERMASK ON BOTH SIDES
3. NO SILKSCREEN
4. ADD UL RATING ON BOTTOM SIDE
5. MATERIAL : FP - 1, GREEN
6. BOARD THICKNESS : 0.063 WITH 1 oz COPPER
7. FINISH : TIN - LEAD

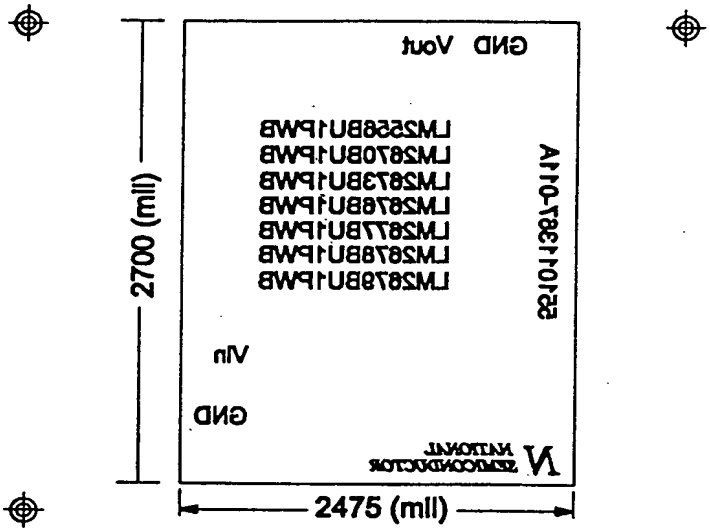


MECHANICAL LAYER 551011367-011A
TOP ETCH 551011367-011A

FIGURE 3 - Topside Cooper

NOTES: UNLESS OTHERWISE SPECIFICED
1. NO FAB SHOP LOGO < DATE CODE REQUIRED
2. APPLY GREEN (LPI) SOLDERMASK ON BOTH SIDES
3. NO SILKSCREEN
4. ADD UL RATING ON BOTTOM SIDE
5. MATERIAL : FP - 1, GREEN
6. BOARD THICKNESS: 0.063 WITH 1 oz COPPER
7. FINISH : TIN - LEAD

Figure 23E



MECHANICAL LAYER 551011367-011A
BOTTOM ETCH 551011367-011A

FIGURE 4 - Bottom Side Copper

Downloadable files

Schematic File

The Schematic File in Protel format.

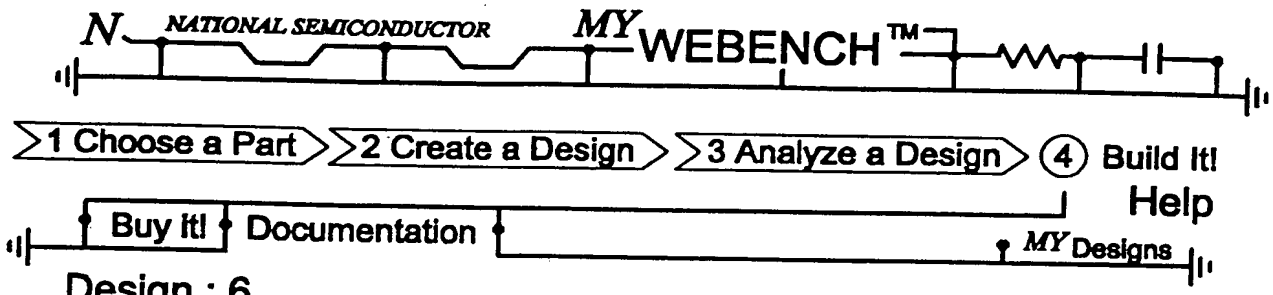
Board Layout File

Board Layout in Protel format.

GERBER File

GERBER file for making the PC Board

Figure 23F



Design : 6

WEBENCH Documentation

Assembly Doc.

The Webench Assembly Document describes in detail how to build your design. It contains the specific assembly diagram for your design, a complete bill of materials and other PC board images and assembly instructions.

Design Doc. ~2440

The WEBENCH Design Document provides a single web page describing your entire design including: design specifications, calculated values, WebSIM simulation results and WebTHERM simulation results.

LM2679 Folder ~2420

LM2679 Product Folder is full of documentation about the National IC used in your design.

My Orders

My Orders is a list of all of your on - line orders.

WEBENCH Downloads

You can download these files to integrate this design into your local CAD environment. These files are self-extracting zip files. For the files stored in Protel format you will need the Protel application or equivalent CAD software capable of opening such files.

Schematic File

The Schematic File in Protel format.

Board Layout File

Board Layout in Protel format.

GERBER File

GERBER file for making the PC Board.

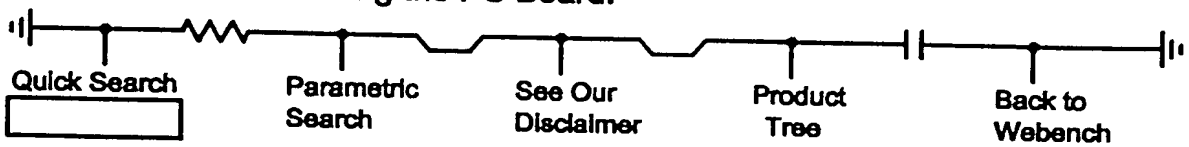
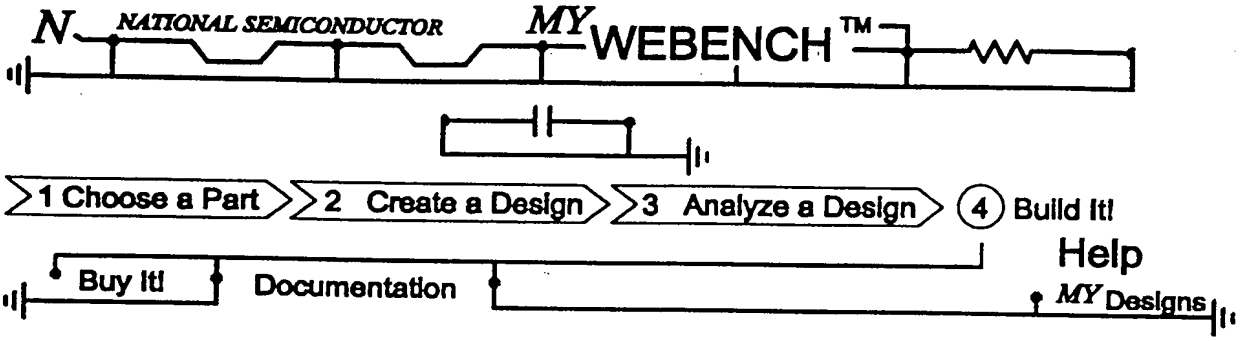


Figure 24



Design Document For Your LM2679 Design # : 7

Table of Contents:

Introduction

Custom power supply designs using tools are available on the POWER.NATIONAL.COM website.

Design Specifications

Design: Design #7
Device: LM2679 Mar 17 2001 3 : 39PM ID: 266796_7

Design Requirements	Output #1
VinMin = 20.00 V	Vout = 5.00 V
VinMax = 22.00 V	Iout = 5.00 A

Schematic

Use WebSIM to display your schematic.

Operating Values

Figure 25A

Operating Values			
#	Description	Parameter	Value
1	Pulse Width Modulation (PWM) Frequency	Frequency	260 kHz
2	Continuous or Discontinuous Conduction Mode, Inductor current goes to zero in Discontinuous Conduction	Mode	Cont
3	Total Output Power	Pout	25.0 W

Operating Point at Vin = 22.00 V			
#	Description	Parameter	Value
1	Bode Plot Crossover Frequency, indication of bandwidth of supply	Cross Freq	97.7 kHz
2	Steady State PWM Duty Cycle, range limits from 0 to 100	Duty Cycle	25.8 %
3	Steady State Efficiency	Efficiency	85.3 %
4	IC Junction Temperature	IC Tj	120 °C
5	IC Junction to Ambient Thermal Resistance	ICThetaJA	34.9 °C/W
6	Bode Plot Phase Margin	Phase Marg	71.0 Deg
7	Peak-to-peak ripple voltage	Vout p-p	0.07 V

Current Analysis			
#	Description	Parameter	Value
1	Input Capacitor RMS ripple current	Cin IRMS	2.2 A
2	Output Capacitor RMS ripple current	Cout IRMS	0.20 A
3	Peak Current in IC for Steady State Operating Point	IC Ipk	5.5 A
4	ICs Maximum rated peak current	IC Ipk Max	7.4 A
5	Average input current	Iin Avg	2.3 A
6	Inductor ripple current, peak-to-peak Value	L Ipp	1.1 A

Figure 25B

Power Dissipation Analysis			
#	Description	Parameter	Value
1	Input Capacitor Power Dissipation	Cin Pd	0.43 W
2	Output Capacitor Power Dissipation	Cout Pd	0.0026 W
3	Diode Power Dissipation	Diode Pd	1.9 W
4	IC Power Dissipation	IC Pd	1.4 W
5	Inductor Power Dissipation	L Pd	0.50 W

LM2679 The Selected IC

NSID = LM2679S-ADJ
Topology = Buck
Package = S

BOM - Bill of Materials

Item	Manufacturer Part	Qty	Attributes	Component Name(s)
1	International Rectifier 12CWQ04FN 	1	VFatio = 0.52 V	D1
2	Keystone 5015	4		TP1, TP2, TP3, TP6
3	National Semiconductor 551011367-011	1	Surface Mount, etc	PC Board
4	Vishay-Sprague 594D156X0035D2T 	3	Cap=15uF ESR= 0.265 Ohms	Cin
5	Vishay-Sprague 594D187X0016R2T 	1	Cap=180uF ESR= 0.065 Ohms	Cout
6	Vishay-Dale CRCW1206-1001FRT1	1	Resistance =1000 Ohms	Rfb1
7	Vishay-Dale CRCW1206-3161FRT1	1	Resistance =3160 Ohms	Rfb2

Figure 25C

8	Vishay-Dale CRCW1206-4991FRT1	1	Resistance = 4990 Ohm	Rilim
9	National Semiconductor LM2679S-ADJ	1	Package=S, Voltage option = ADJ Topology = Buck	IC
10	Coiltronics UP4B-150	1	L = 15uH DCR = 0.02 Ohm	L1
11	Vishay-Vitramon VJ1206A392JXAAT	1	Cap = 0.0039 uF	Css
12	Vishay-Vitramon VJ1206Y103KXAAT	1	Cap = 0.01 uF	Cb
13	Vishay-Vitramon VJ1206Y104KXAAT	1		Cinx

WebTHERM - Thermal Simulation Results

You have performed 3 WebTHERM thermal simulation(s) on this design. Here are the results of the most recent one.

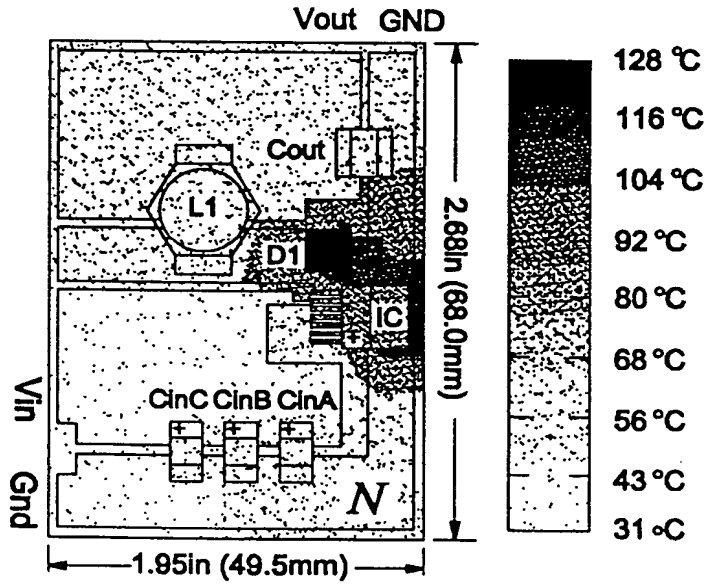


Figure 25D

Be sure to electrically simulate this design using webSIM.

Build It!

Webench provides both custom and generic evaluation boards to assist you in the building of prototypes of your design. Additionally, for some designs, it is possible to order the complete BOM (Bill of Materials) on-line using Webench.

A custom evaluation board is available for your design!

Webench provides a custom evaluation board which may be on-line ordered from Pioneer-Standard for designs like yours using National LM2679S-ADJ configured in the Buck topology.

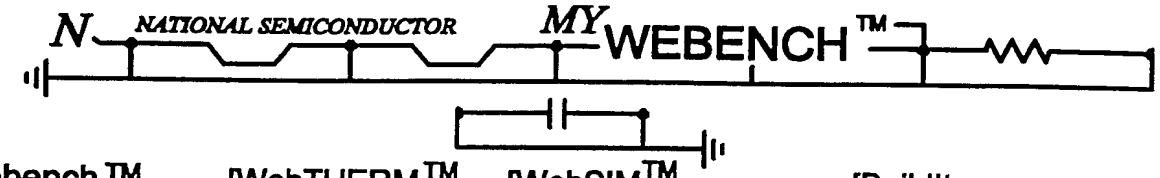
Appendices

A. You have performed 3 thermal simulation(s) on this design.

ID	Simulation Name	Date
1	Simulation for Design 7	Mar 17 2001 5 : 10 PM
2	Simulation for Design 7	Mar 17 2001 5 : 19 PM
3	Simulation for Design 7	Mar 17 2001 5 : 23 PM

B. No electrical simulation(s) performed on this design.

Figure 25E



[Webench™ Designs] [WebTHERM™ Simulations] [WebSIM™ Simulations] [BuildIt Orders]

Tim Sullivan - You have 7 designs stored in your personal workspace

ID	Design Name	Device	Creation Date	Modification Date	Design Assistant	Comments	Design Operations
7	Design # 7	LM2679	Mar 17 2001 3 : 39PM	Mar 17 2001 3 : 57PM	Power		Modify, Analyze, Build, Add Notes, Delete, Share
6	Design # 6	LM2679	Mar 15 2001 3 : 23PM	Mar 15 2001 3 : 23PM	Power		Modify, Analyze, Build, Add Notes, Delete, Share
5	Design # 5	LM2679	Mar 15 2001 11 : 41AM	Mar 15 2001 11 : 44AM	Power		Modify, Analyze, Build, Add Notes, Delete, Share
4	Design # 4	LM2679	Mar 13 2001 9 : 52AM	Mar 13 2001 10 : 03AM	Power		Modify, Analyze, Build, Add Notes, Delete, Share
3	Design # 3	LM2679	Mar 13 2001 9 : 52AM		Power		Modify, Analyze, Build, Add Notes, Delete, Share
2	Design # 2	LM2678	Mar 13 2001 9: 50AM		Power		Modify, Analyze, Build, Add Notes, Delete, Share
1	Design # 1	LM2678	Mar 13 2001 9: 50AM		Power		Modify, Analyze, Build, Add Notes, Delete, Share

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Figure 26

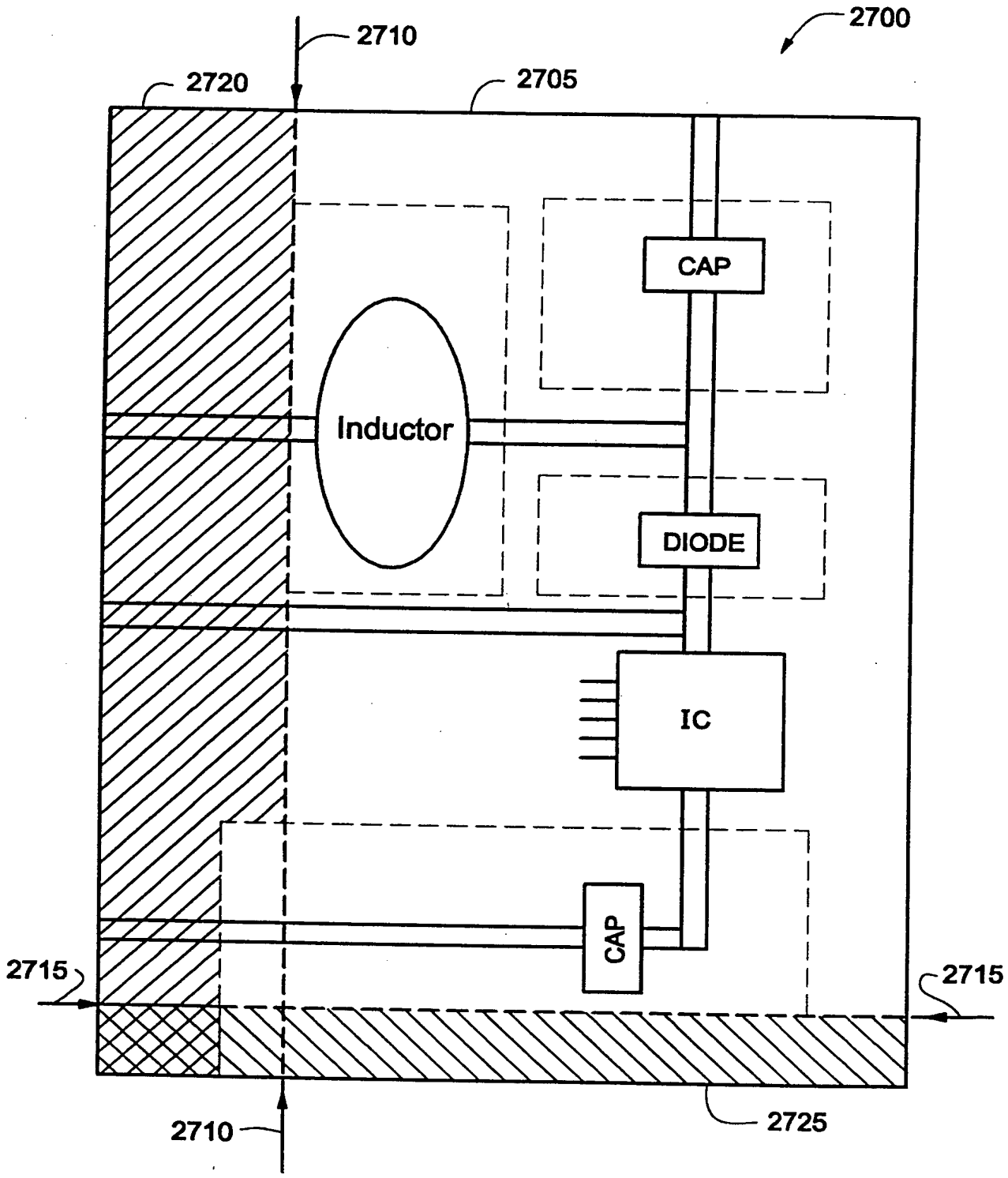
2700
2710
2720
2705
CAP
Inductor
DIODE
IC
CAP
2715
2715
2710
2725

Figure 27

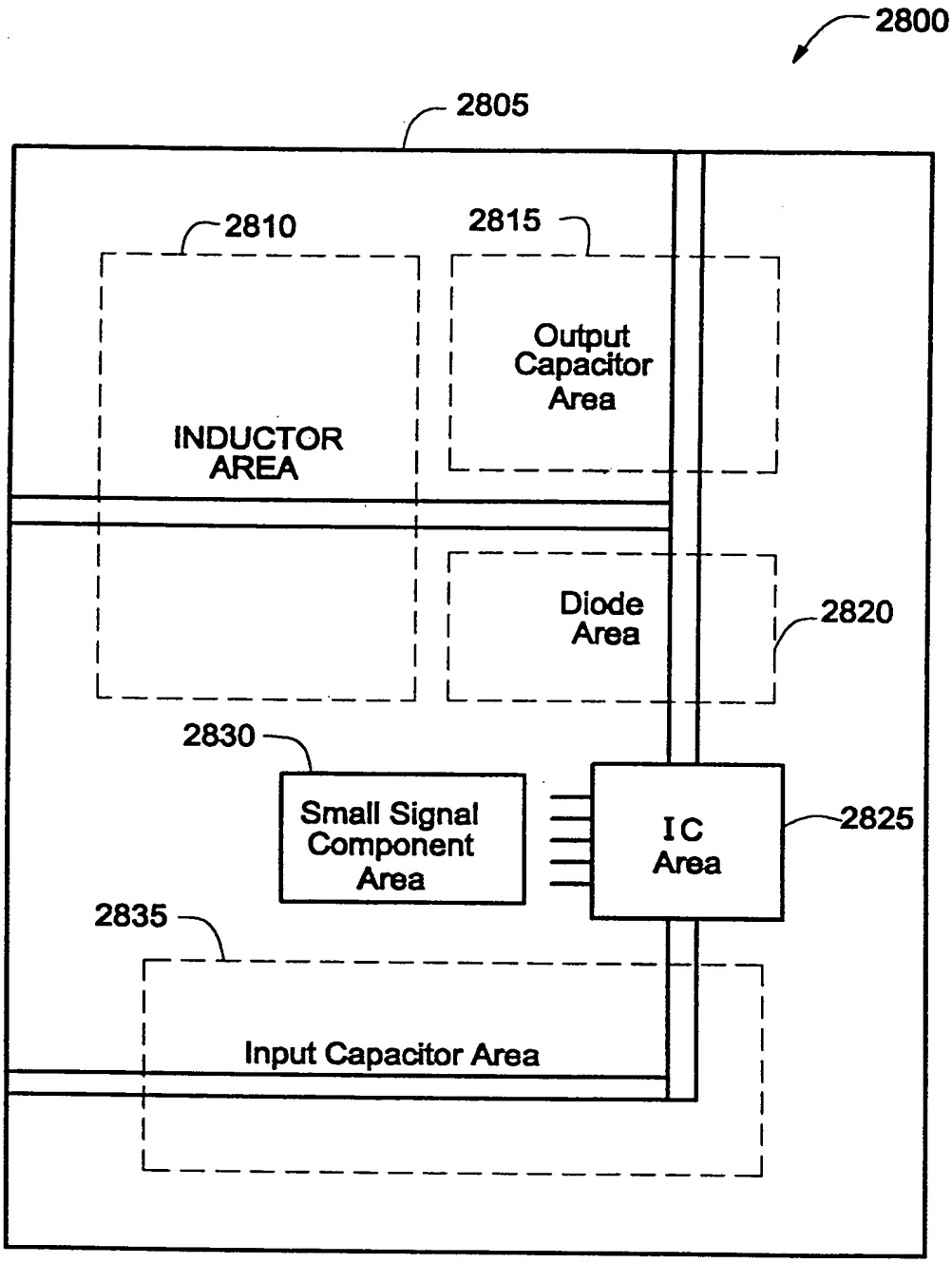
2800
2805
2810
2815
Output Capacitor Area
INDUCTOR AREA
Diode Area
2820
2830
Small Signal Component Area
IC Area
2825
2835
Input Capacitor Area

Figure 28

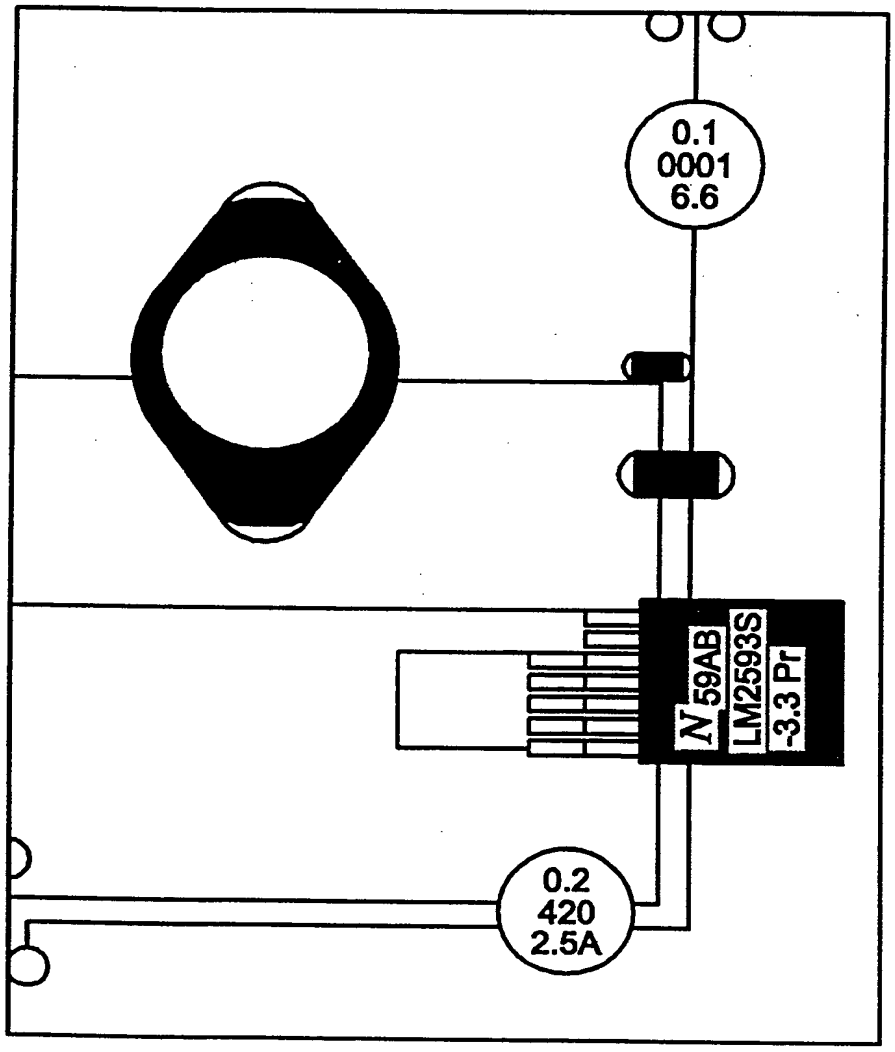

Figure 29A

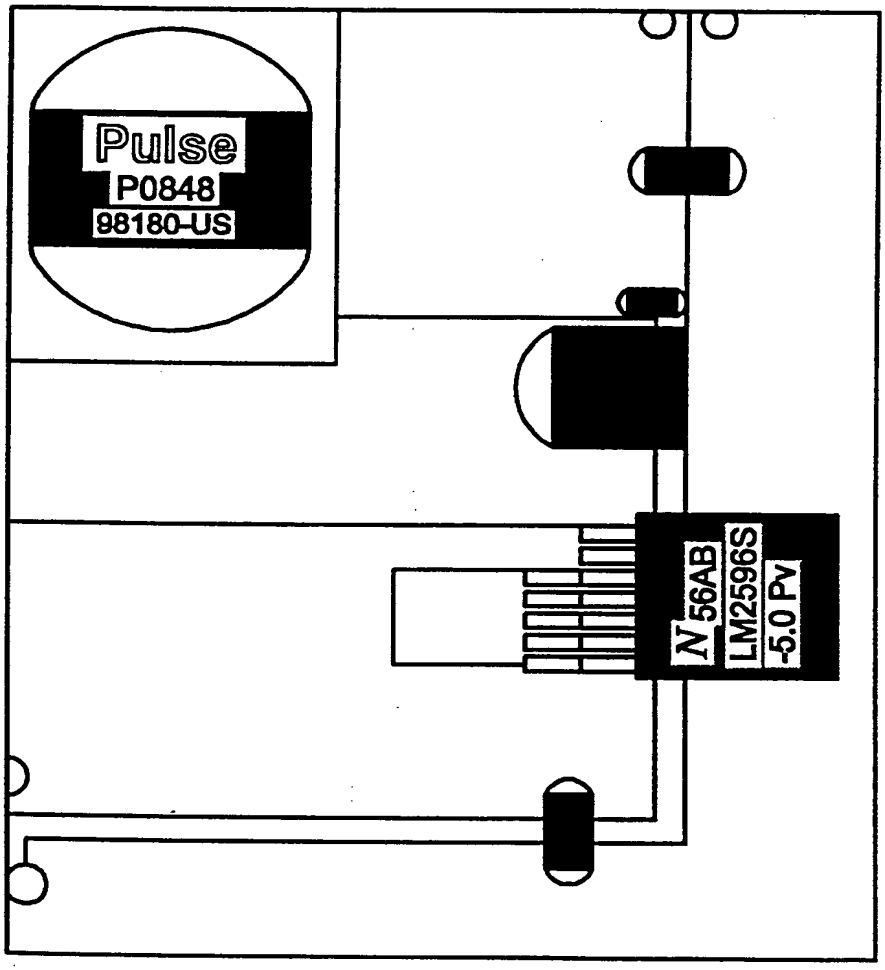

Figure 29B

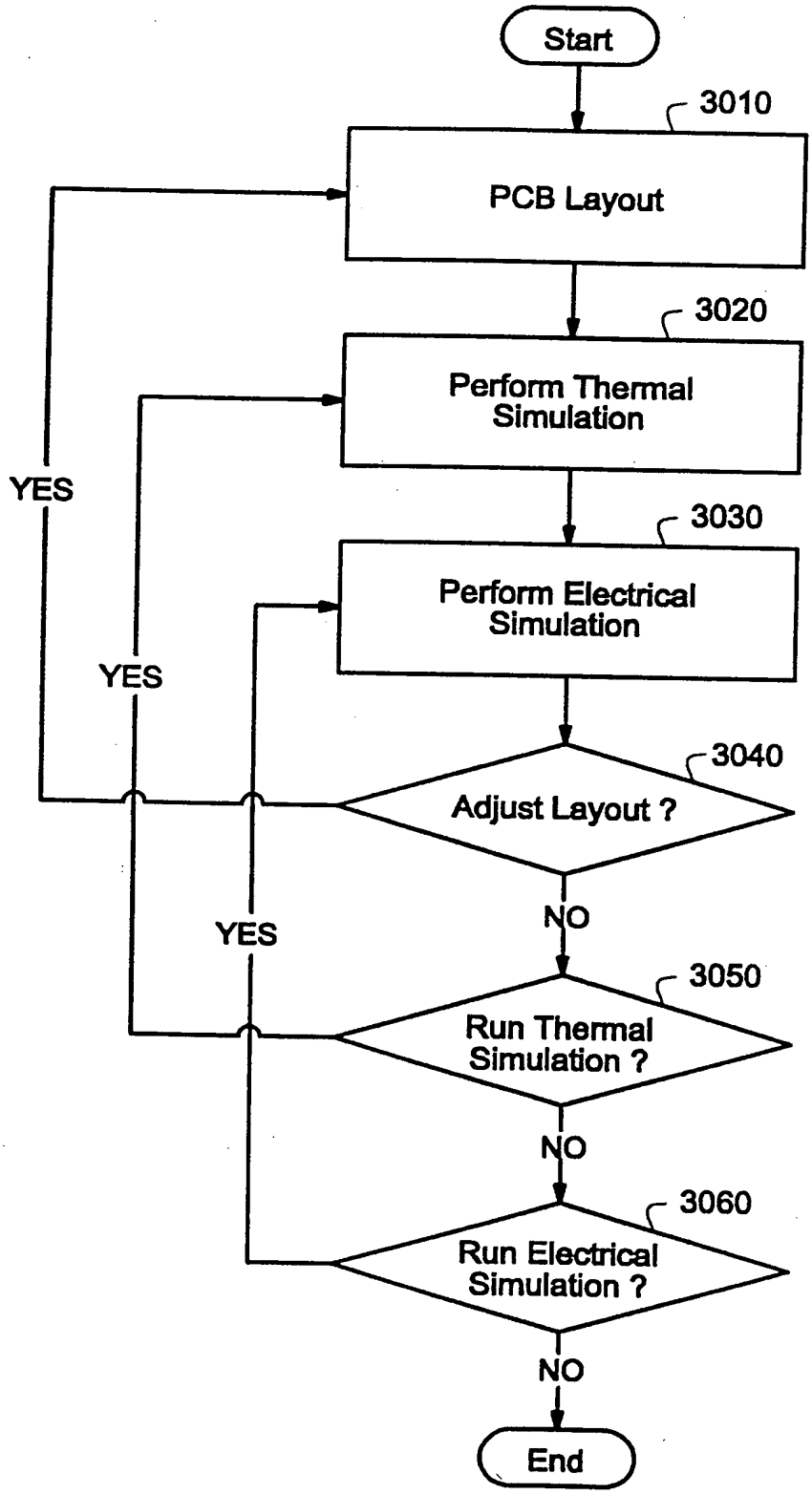
Start
3010
PCB Layout
3020
Perform Thermal Simulation
3030
Perform Electrical Simulation
3040
Adjust Layout ?
3050
Run Thermal Simulation ?
3060
Run Electrical Simulation ?
End
YES
YES
YES
NO
NO
NO

Figure 30

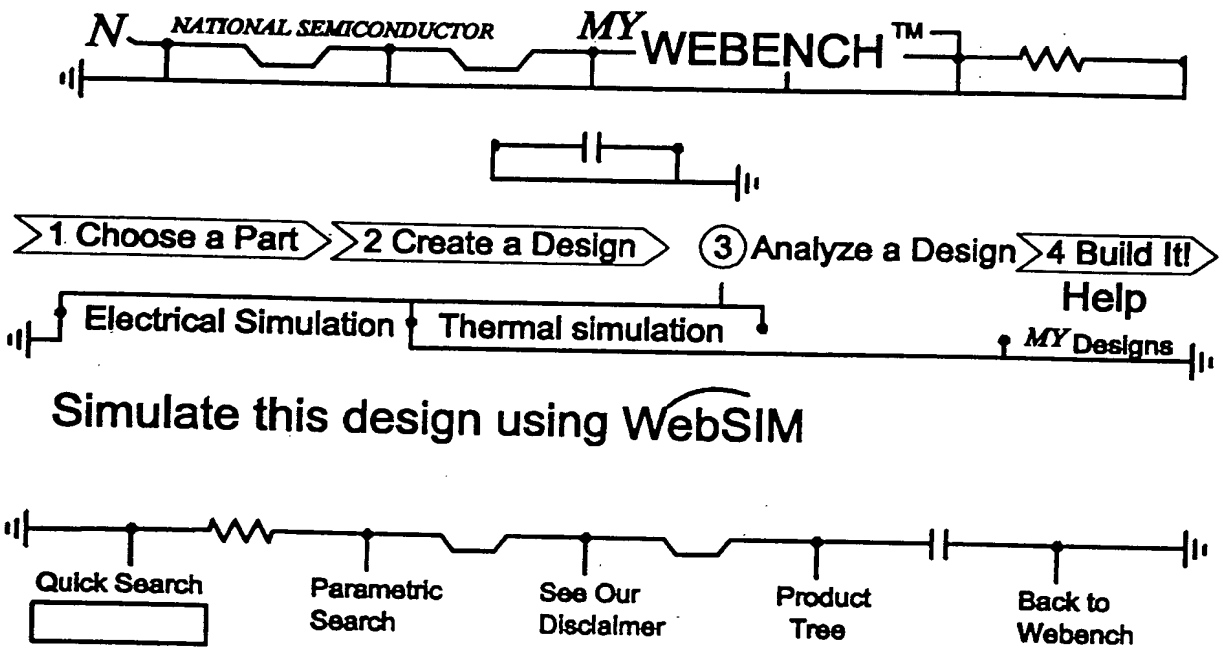

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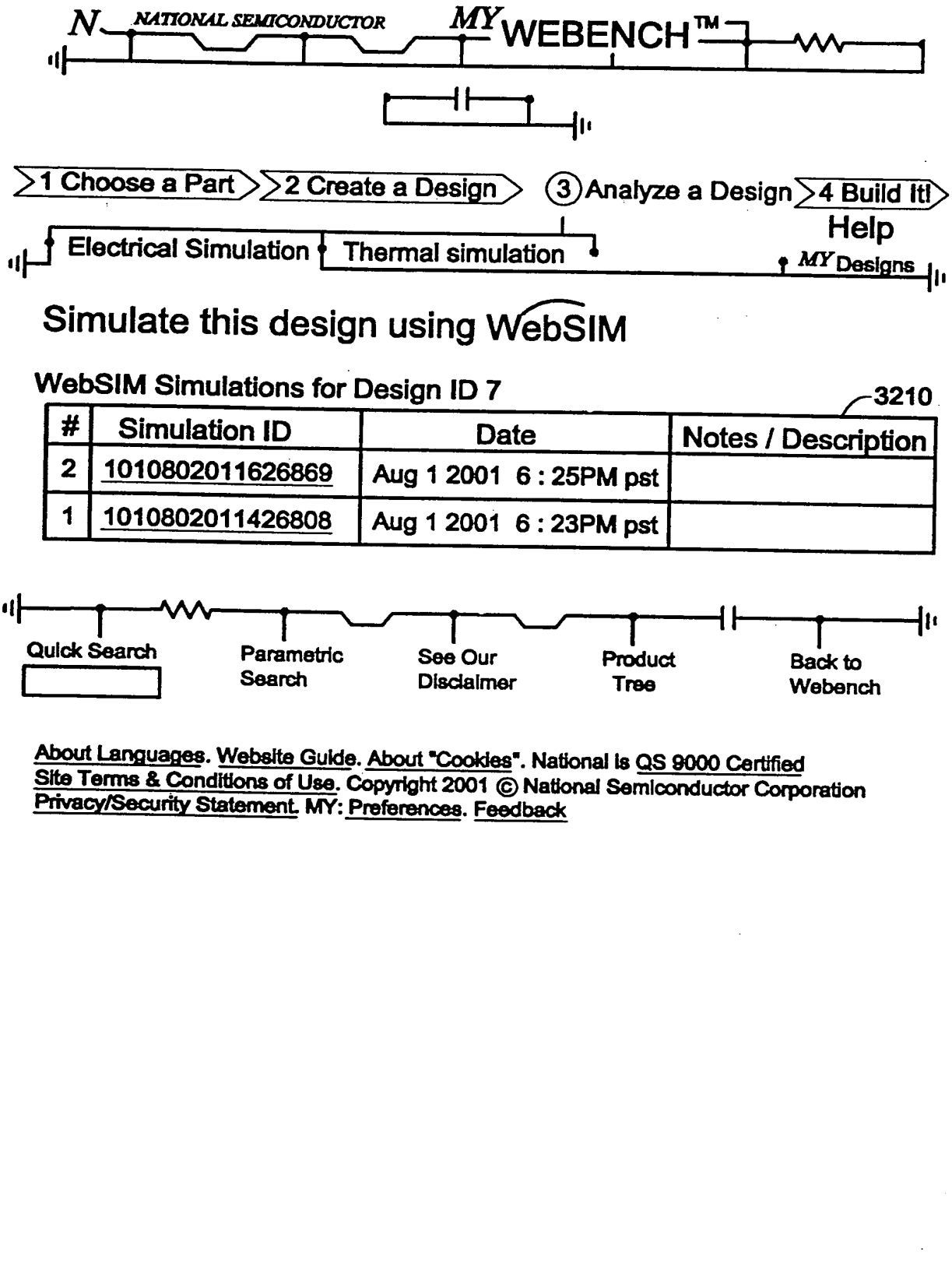
Figure 31


NATIONAL SEMICONDUCTOR
MY WEBENCH™
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
Electrical Simulation
Thermal simulation
MY Designs
Simulate this design using WebSIM
WebSIM Simulations for Design ID 7
3210
| Simulation ID | Date | Notes / Description
2 | 1010802011626869 | Aug 1 2001 6 : 25PM pst |
1 | 1010802011426808 | Aug 1 2001 6 : 23PM pst |
Quick Search
Parametric Search
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Product Tree
Back to Webench
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Figure 32

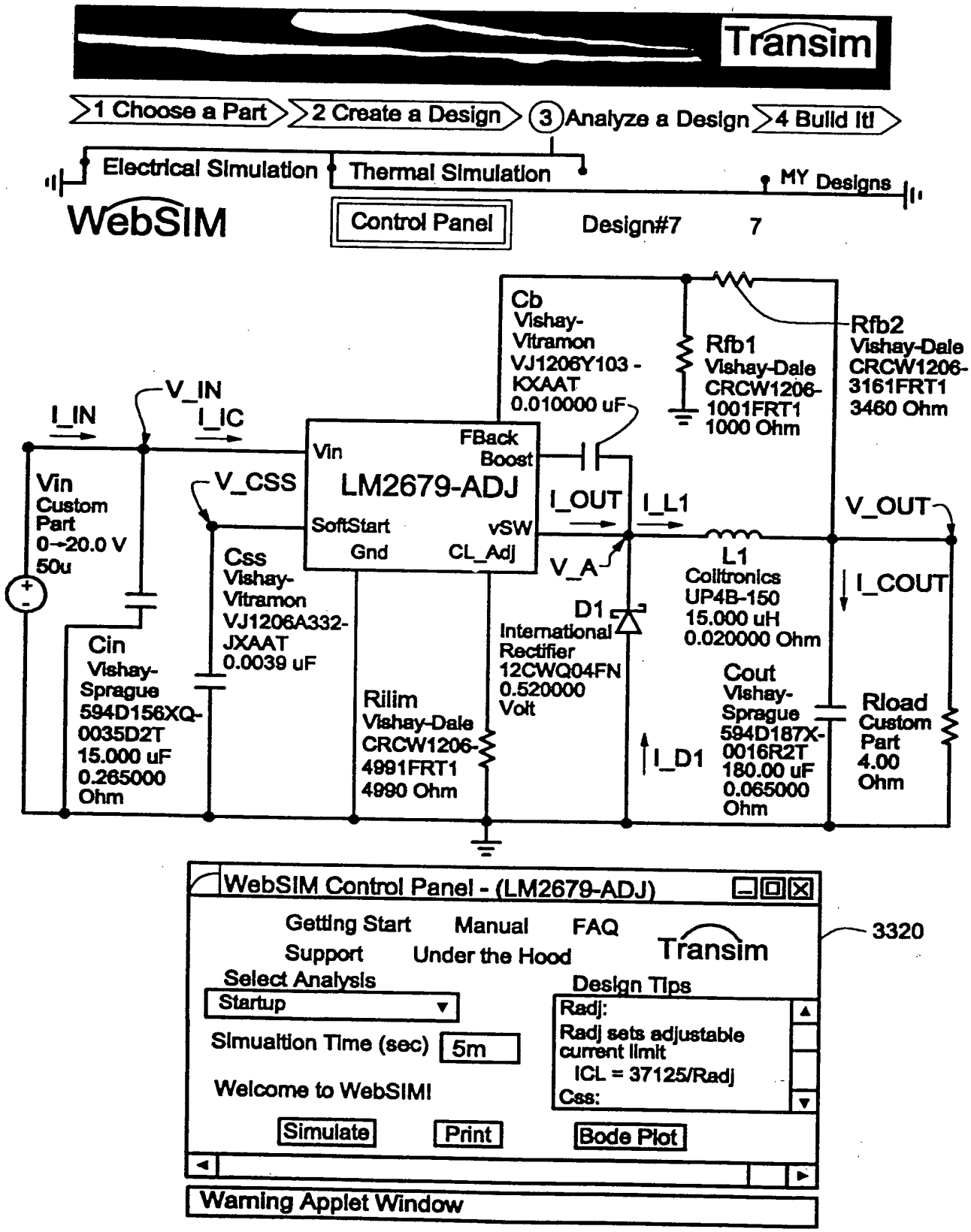
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design#7
7
Cb
Vishay-Vitramon
VJ1206Y103-KXAAT
0.010000 uF
Rfb1
Vishay-Dale
CRCW1206-1001FRT1
1000 Ohm
Rfb2
Vishay-Dale
CRCW1206-3161FRT1
3460 Ohm
I_IN
V_IN
I_IC
Vin
FBack
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
V_CSS
I_OUT
I_L1
V_OUT
V_A
Vin
Custom Part
0-20.0 V
50u
Css
Vishay-Vitramon
VJ1206A332-JXAAT
0.0039 uF
L1
Coiltronics
UP4B-150
15.000 uH
0.020000 Ohm
I_COUT
D1
International Rectifier
12CWQ04FN
0.520000 Volt
Cin
Vishay-Sprague
594D156XQ-0035D2T
15.000 uF
0.265000 Ohm
Rilim
Vishay-Dale
CRCW1206-4991FRT1
4990 Ohm
Cout
Vishay-Sprague
594D187X-0016R2T
180.00 uF
0.065000 Ohm
I_D1
Rload
Custom Part
4.00 Ohm
WebSIM Control Panel - (LM2679-ADJ)
Getting Start
Manual
FAQ
Support
Under the Hood
Transim
3320
Select Analysis
Startup
Design Tips
Radj:
Radj sets adjustable current limit
ICL = 37125/Radj
Css:
Simulation Time (sec)
5m
Welcome to WebSIM!
Simulate
Print
Bode Plot
Warning Applet Window

Figure 33

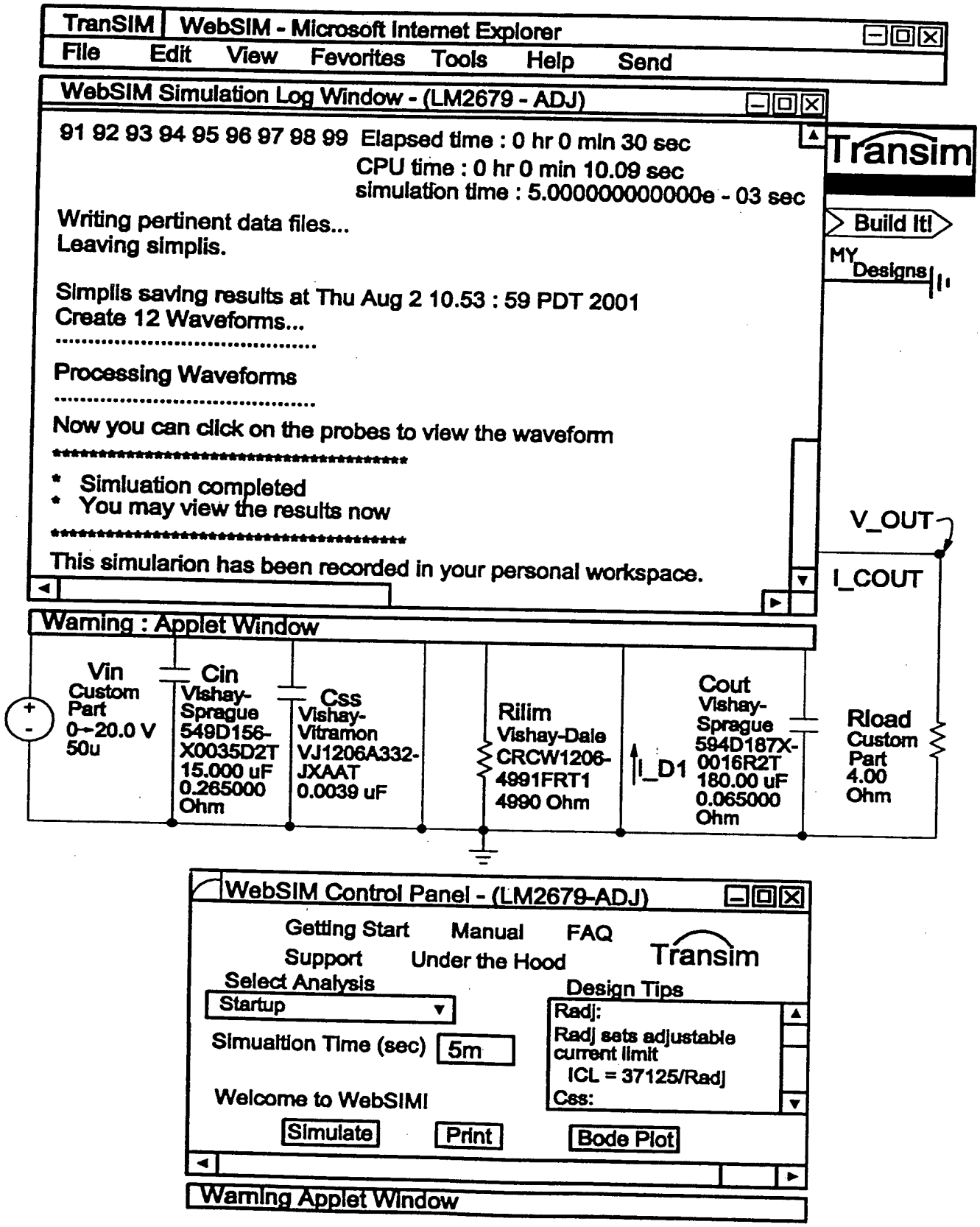
TranSIM
WebSIM - Microsoft Internet Explorer
File Edit View Fevorites Tools Help Send
WebSIM Simulation Log Window - (LM2679 - ADJ)
91 92 93 94 95 96 97 98 99 Elapsed time : 0 hr 0 min 30 sec
CPU time : 0 hr 0 min 10.09 sec
simulation time : 5.000000000000e - 03 sec
Writing pertinent data files...
Leaving simplis.
Simplis saving results at Thu Aug 2 10.53 : 59 PDT 2001
Create 12 Waveforms...
Processing Waveforms
Now you can click on the probes to view the waveform
* Simluation completed
* You may view the results now
This simularion has been recorded in your personal workspace.
Transim
Build It!
MY Designs
V_OUT
I_COUT
Warning : Applet Window
Vin
Custom Part
0~20.0 V
50u
Cin
Vishay-Sprague
549D156-X0035D2T
15.000 uF
0.265000 Ohm
Css
Vishay-Vitramon
VJ1206A332-JXAAT
0.0039 uF
Rilim
Vishay-Dale
CRCW1206-4991FRT1
4990 Ohm
I_D1
Cout
Vishay-Sprague
594D187X-0016R2T
180.00 uF
0.065000 Ohm
Rload
Custom Part
4.00 Ohm
WebSIM Control Panel - (LM2679-ADJ)
Getting Start Manual FAQ
Support Under the Hood
Transim
Select Analysis
Startup
Simualtion Time (sec) 5m
Welcome to WebSIM!
Simulate Print Bode Plot
Design Tips
Radj:
Radj sets adjustable current limit
ICL = 37125/Radj
Css:
Warning Applet Window

Figure 34

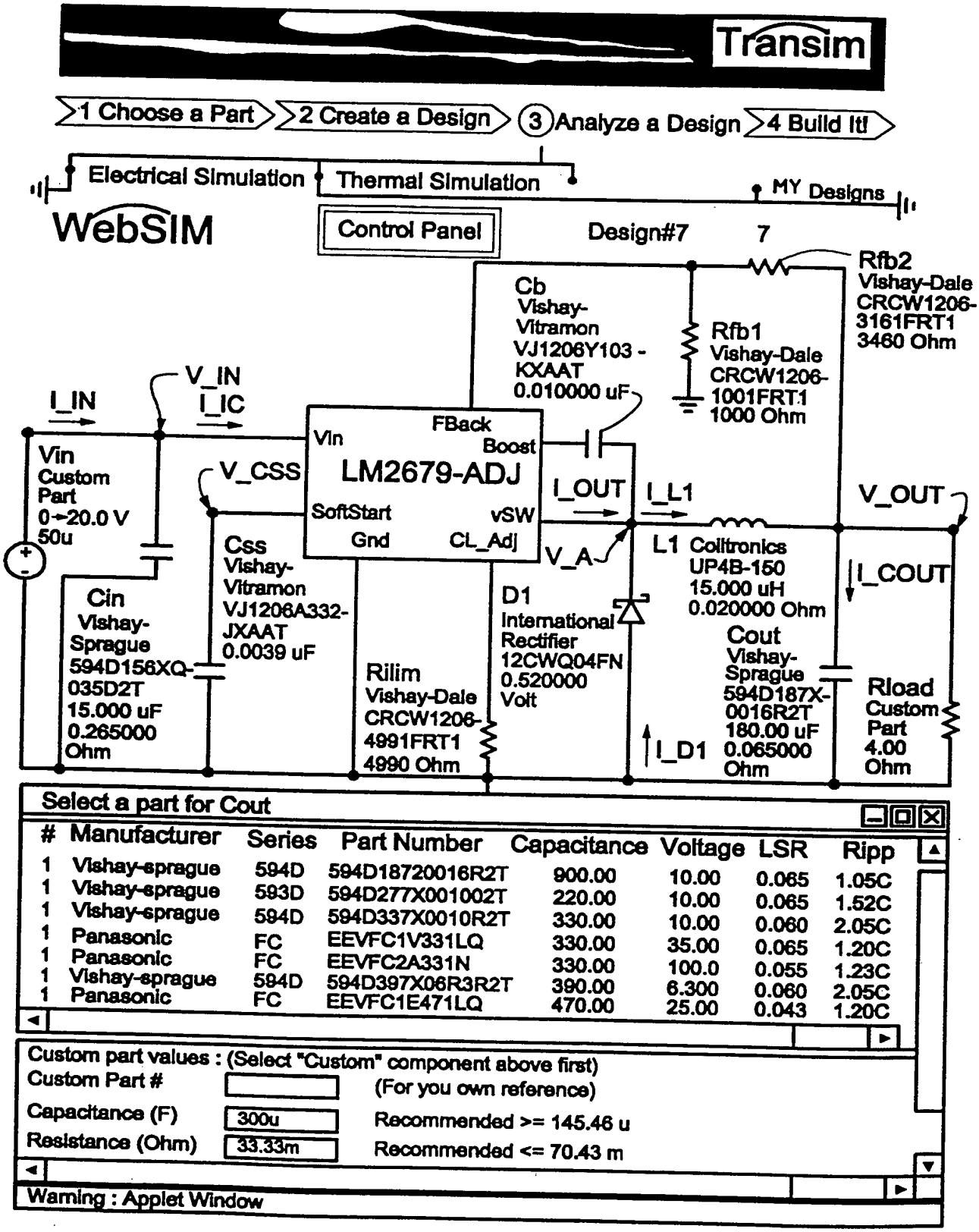
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design#7
7
Rfb2
Vishay-Dale
CRCW1206-
3161FRT1
3460 Ohm
Cb
Vishay-
Vitramon
VJ1206Y103 -
KXAAT
0.010000 uF
Rfb1
Vishay-Dale
CRCW1206-
1001FRT1
1000 Ohm
I_IN
V_IN
I_IC
Vin
Custom
Part
0-20.0 V
50u
V_CSS
Vin
FBack
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
I_OUT
I_L1
V_OUT
V_A
L1 Coiltronics
UP4B-150
15.000 uH
0.020000 Ohm
I_COUT
Cin
Vishay-
Sprague
594D156XQ-
035D2T
15.000 uF
0.265000
Ohm
Css
Vishay-
Vitramon
VJ1206A332-
JXAAT
0.0039 uF
D1
International
Rectifier
12CWQ04FN
0.520000
Volt
Cout
Vishay-
Sprague
594D187X-
0016R2T
180.00 uF
0.065000
Ohm
I_D1
Rload
Custom
Part
4.00
Ohm
Rilim
Vishay-Dale
CRCW1206-
4991FRT1
4990 Ohm
Select a part for Cout
Manufacturer Series Part Number Capacitance Voltage LSR Ripp
1 Vishay-sprague 594D 594D18720016R2T 900.00 10.00 0.065 1.05C
1 Vishay-sprague 593D 594D277X001002T 220.00 10.00 0.065 1.52C
1 Vishay-sprague 594D 594D337X0010R2T 330.00 10.00 0.060 2.05C
1 Panasonic FC EEVFC1V331LQ 330.00 35.00 0.065 1.20C
1 Panasonic FC EEVFC2A331N 330.00 100.0 0.055 1.23C
1 Vishay-sprague 594D 594D397X06R3R2T 390.00 6.300 0.060 2.05C
1 Panasonic FC EEVFC1E471LQ 470.00 25.00 0.043 1.20C
Custom part values : (Select "Custom" component above first)
Custom Part #
(For you own reference)
Capacitance (F) 300u
Recommended >= 145.46 u
Resistance (Ohm) 33.33m
Recommended <= 70.43 m
Warning : Applet Window

Figure 35

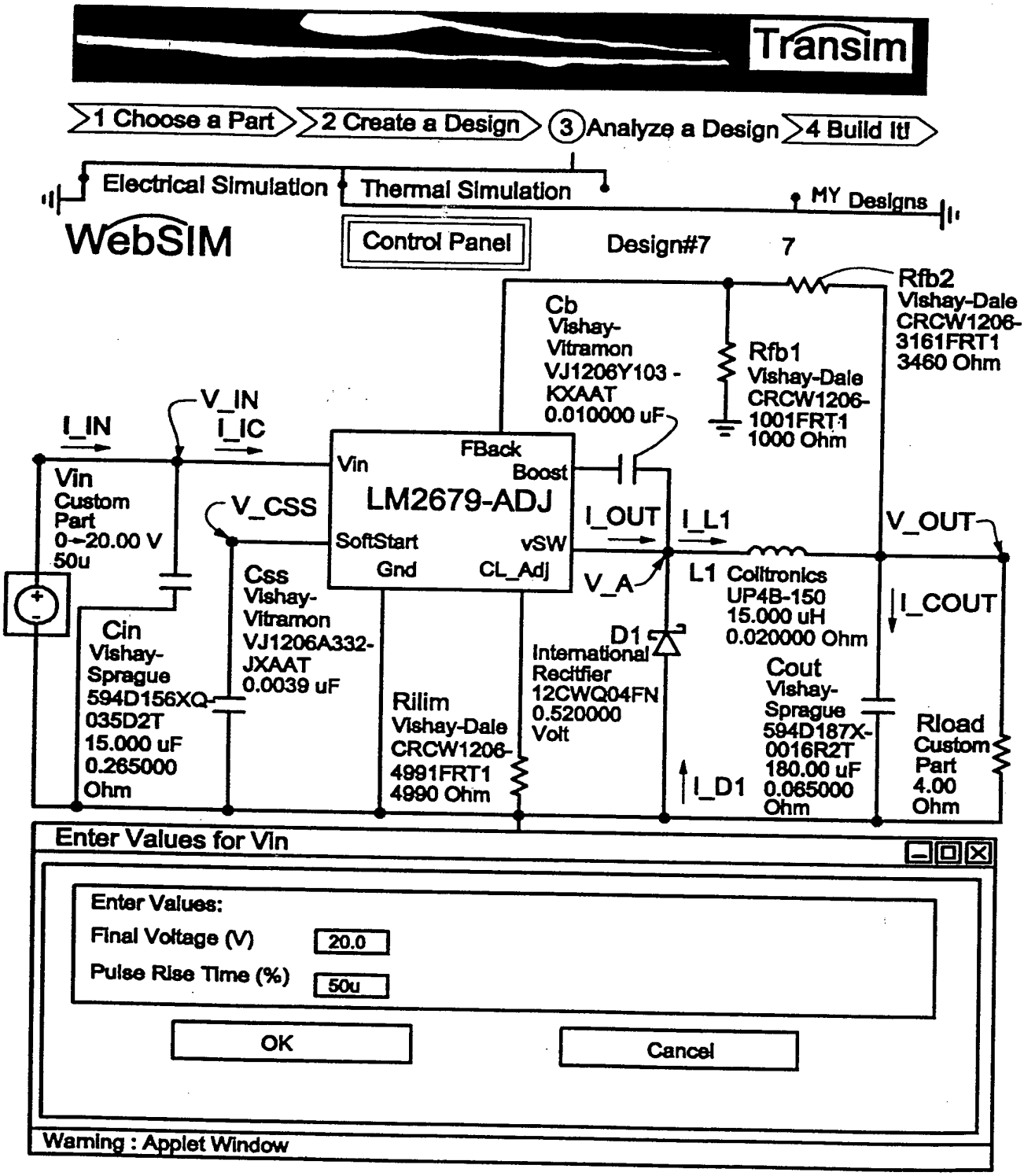
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design#7
7
Cb
Vishay-Vitramon
VJ1206Y103 - KXAAT
0.010000 uF
Rfb1
Vishay-Dale
CRCW1206-1001FRT1
1000 Ohm
Rfb2
Vishay-Dale
CRCW1206-3161FRT1
3460 Ohm
I_IN
V_IN
I_IC
Vin
Custom Part
0-20.00 V
50u
V_CSS
FBack
Vin
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
I_OUT
I_L1
V_OUT
V_A
L1 Coiltronics
UP4B-150
15.000 uH
0.020000 Ohm
I_COUT
Cin
Vishay-Sprague
594D156XQ-035D2T
15.000 uF
0.265000 Ohm
Css
Vishay-Vitramon
VJ1206A332-JXAAT
0.0039 uF
D1
International Rectifier
12CWQ04FN
0.520000 Volt
Cout
Vishay-Sprague
594D187X-0016R2T
180.00 uF
0.065000 Ohm
Rilim
Vishay-Dale
CRCW1206-4991FRT1
4990 Ohm
I_D1
Rload
Custom Part
4.00 Ohm
Enter Values for Vin
Enter Values:
Final Voltage (V)
20.0
Pulse Rise Time (%)
50u
OK
Cancel
Warning : Applet Window

Figure 36

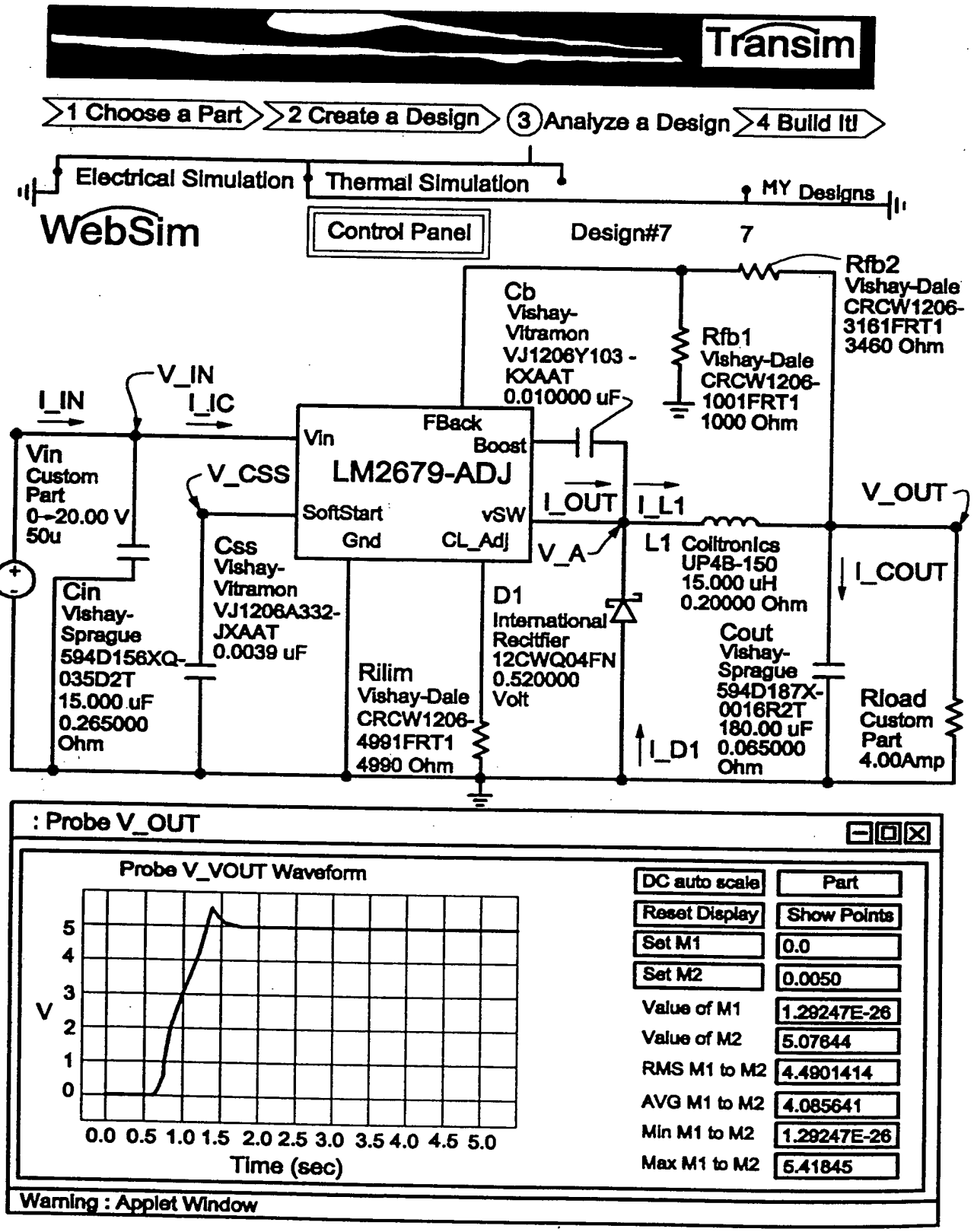
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSim
Control Panel
Design#7
7
Rfb2
Vishay-Dale
CRCW1206-
3161FRT1
3460 Ohm
Cb
Vishay-
Vitramon
VJ1206Y103 -
KXAAT
0.010000 uF
Rfb1
Vishay-Dale
CRCW1206-
1001FRT1
1000 Ohm
V_IN
I_IN
I_IC
FBack
Vin
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
V_CSS
I_OUT
I_L1
V_OUT
V_A
Vin
Custom
Part
0-20.00 V
50u
Css
Vishay-
Vitramon
VJ1206A332-
JXAAT
0.0039 uF
L1 Coiltronics
UP4B-150
15.000 uH
0.20000 Ohm
I_COUT
Cin
Vishay-
Sprague
594D156XQ-
035D2T
15.000 uF
0.265000
Ohm
D1
International
Recitfier
12CWQ04FN
0.520000
Volt
Cout
Vishay-
Sprague
594D187X-
0016R2T
180.00 uF
0.065000
Ohm
Rload
Custom
Part
4.00Amp
Rilim
Vishay-Dale
CRCW1206-
4991FRT1
4990 Ohm
I_D1
: Probe V_OUT
Probe V_VOUT Waveform
V
5
4
3
2
1
0
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
Time (sec)
DC auto scale
Part
Reset Display
Show Points
Set M1
0.0
Set M2
0.0050
Value of M1
1.29247E-26
Value of M2
5.07644
RMS M1 to M2
4.4901414
AVG M1 to M2
4.085641
Min M1 to M2
1.29247E-26
Max M1 to M2
5.41845
Warning : Applet Window

Figure 37

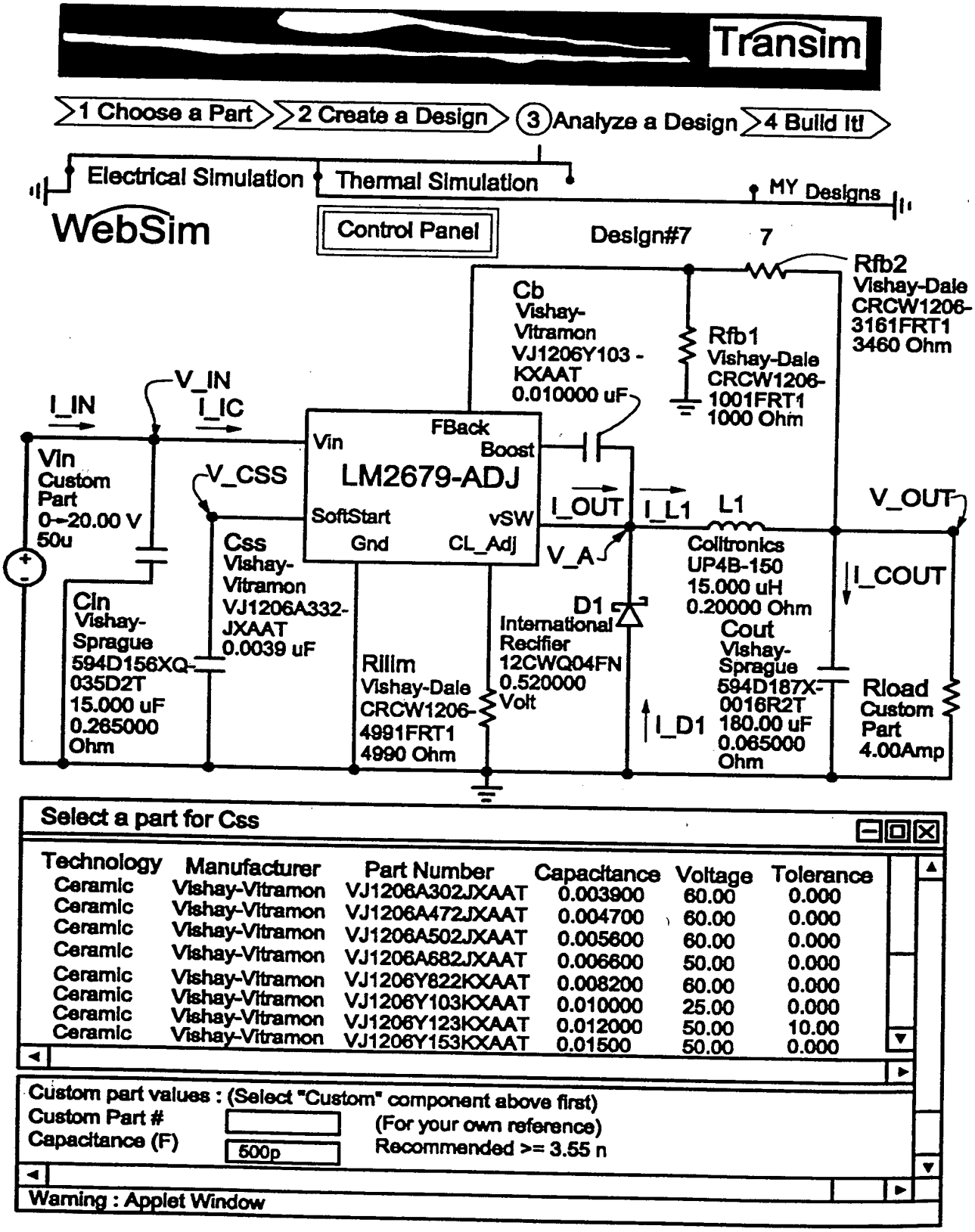
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSim
Control Panel
Design#7
7
Rfb2
Vishay-Dale
CRCW1206-
3161FRT1
3460 Ohm
Cb
Vishay-
Vitramon
VJ1206Y103 -
KXAAT
0.010000 uF
Rfb1
Vishay-Dale
CRCW1206-
1001FRT1
1000 Ohm
V_IN
I_IN
I_IC
FBack
Vin
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
Vin
Custom
Part
0-20.00 V
50u
V_CSS
I_OUT
I_L1
L1
V_OUT
Css
Vishay-
Vitramon
VJ1206A332-
JXAAT
0.0039 uF
V_A
Coiltronics
UP4B-150
15.000 uH
0.20000 Ohm
I_COUT
Cin
Vishay-
Sprague
594D156XQ-
035D2T
15.000 uF
0.265000
Ohm
D1
International
Recifier
12CWQ04FN
0.520000
Volt
Cout
Vishay-
Sprague
594D187X-
0016R2T
180.00 uF
0.065000
Ohm
Rlim
Vishay-Dale
CRCW1206-
4991FRT1
4990 Ohm
I_D1
Rload
Custom
Part
4.00Amp
Select a part for Css
Technology
Manufacturer
Part Number
Capacitance
Voltage
Tolerance
Ceramic Vishay-Vitramon VJ1206A302JXAAT 0.003900 60.00 0.000
Ceramic Vishay-Vitramon VJ1206A472JXAAT 0.004700 60.00 0.000
Ceramic Vishay-Vitramon VJ1206A502JXAAT 0.005600 60.00 0.000
Ceramic Vishay-Vitramon VJ1206A682JXAAT 0.006600 50.00 0.000
Ceramic Vishay-Vitramon VJ1206Y822KXAAT 0.008200 60.00 0.000
Ceramic Vishay-Vitramon VJ1206Y103KXAAT 0.010000 25.00 0.000
Ceramic Vishay-Vitramon VJ1206Y123KXAAT 0.012000 50.00 10.00
Ceramic Vishay-Vitramon VJ1206Y153KXAAT 0.01500 50.00 0.000
Custom part values : (Select "Custom" component above first)
Custom Part #
Capacitance (F)
500p
(For your own reference)
Recommended >= 3.55 n
Warning : Applet Window

Figure 38

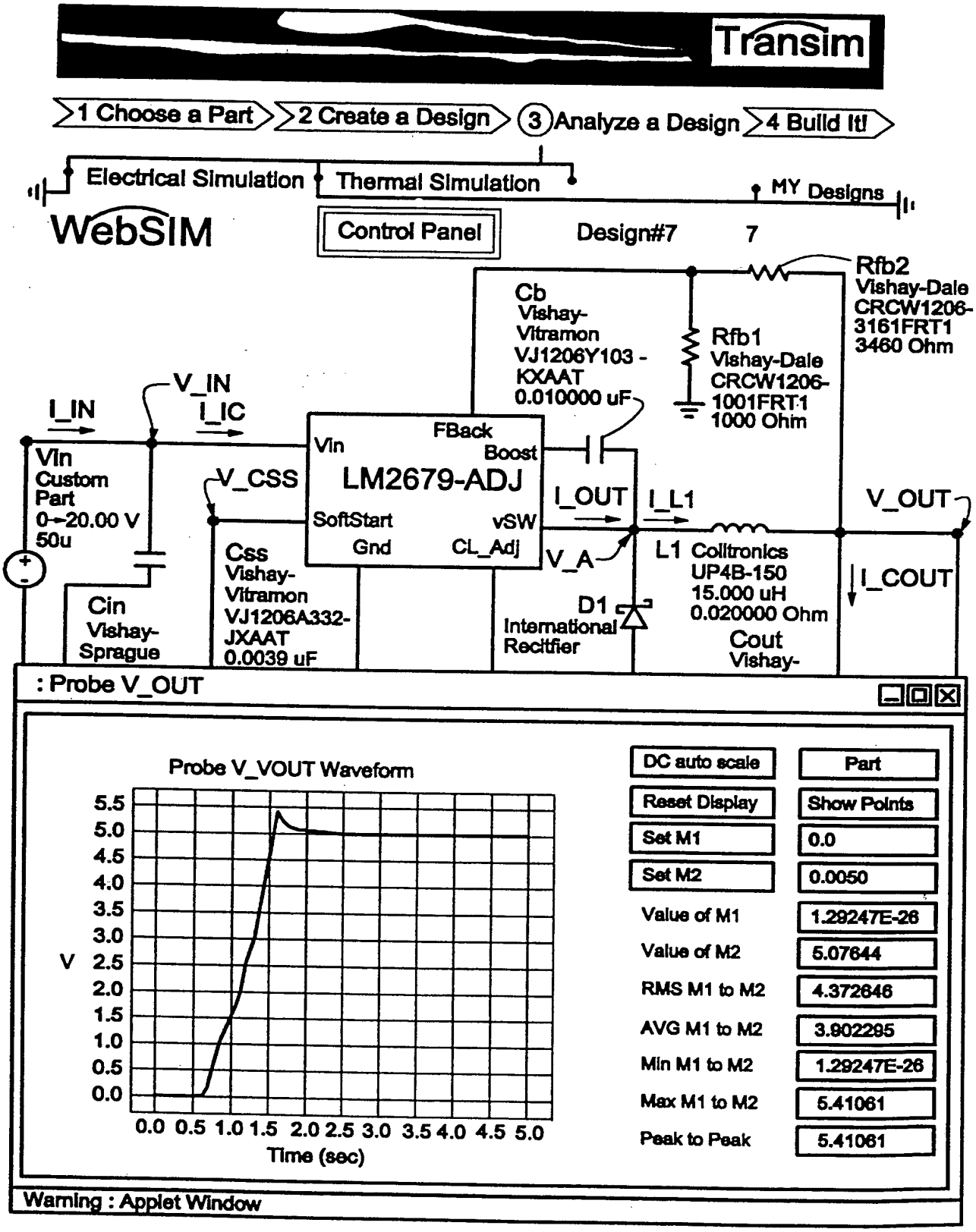
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design#7
7
Rfb2
Vishay-Dale
CRCW1206-
3161FRT1
3460 Ohm
Cb
Vishay-
Vitramon
VJ1206Y103 -
KXAAT
0.010000 uF
Rfb1
Vishay-Dale
CRCW1206-
1001FRT1
1000 Ohm
V_IN
I_IN
I_IC
Vin
Custom
Part
0-20.00 V
50u
FBack
Vin
Boost
LM2679-ADJ
SoftStart
vSW
Gnd
CL_Adj
V_CSS
I_OUT
I_L1
V_OUT
V_A
L1 Coiltronics
UP4B-150
15.000 uH
0.020000 Ohm
I_COUT
Cout
Vishay-
Cin
Vishay-
Sprague
Css
Vishay-
Vitramon
VJ1206A332-
JXAAT
0.0039 uF
D1
International
Rectifier
: Probe V_OUT
Probe V_VOUT Waveform
V
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
Time (sec)
DC auto scale
Part
Reset Display
Show Points
Set M1
0.0
Set M2
0.0050
Value of M1
1.29247E-26
Value of M2
5.07644
RMS M1 to M2
4.372646
AVG M1 to M2
3.902295
Min M1 to M2
1.29247E-26
Max M1 to M2
5.41061
Peak to Peak
5.41061
Warning : Applet Window

Figure 39

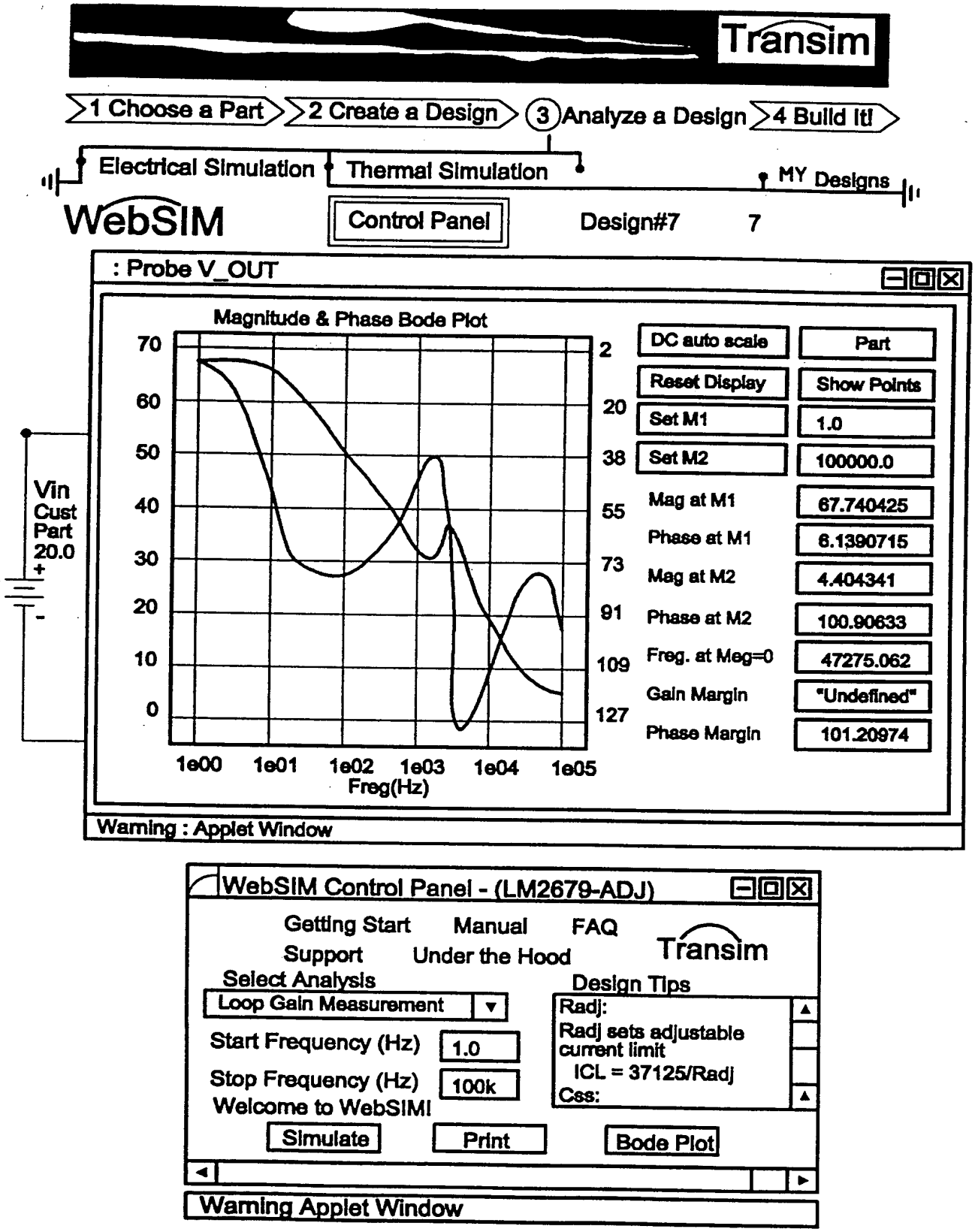
Transim
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build it!
Electrical Simulation
Thermal Simulation
MY Designs
WebSIM
Control Panel
Design#7
7
: Probe V_OUT
Magnitude & Phase Bode Plot
70
60
50
40
30
20
10
0
2
20
38
55
73
91
109
127
1e00
1e01
1e02
1e03
1e04
1e05
Freq(Hz)
DC auto scale
Part
Reset Display
Show Points
Set M1
1.0
Set M2
100000.0
Mag at M1
67.740425
Phase at M1
6.1390715
Mag at M2
4.404341
Phase at M2
100.90633
Freq. at Mag=0
47275.062
Gain Margin
"Undefined"
Phase Margin
101.20974
Vin
Cust
Part
20.0
+
-
Warning : Applet Window
WebSIM Control Panel - (LM2679-ADJ)
Getting Start
Manual
FAQ
Support
Under the Hood
Transim
Select Analysis
Loop Gain Measurement
Start Frequency (Hz)
1.0
Stop Frequency (Hz)
100k
Welcome to WebSIM!
Design Tips
Radj:
Radj sets adjustable current limit
ICL = 37125/Radj
Css:
Simulate
Print
Bode Plot
Warning Applet Window

Figure 40

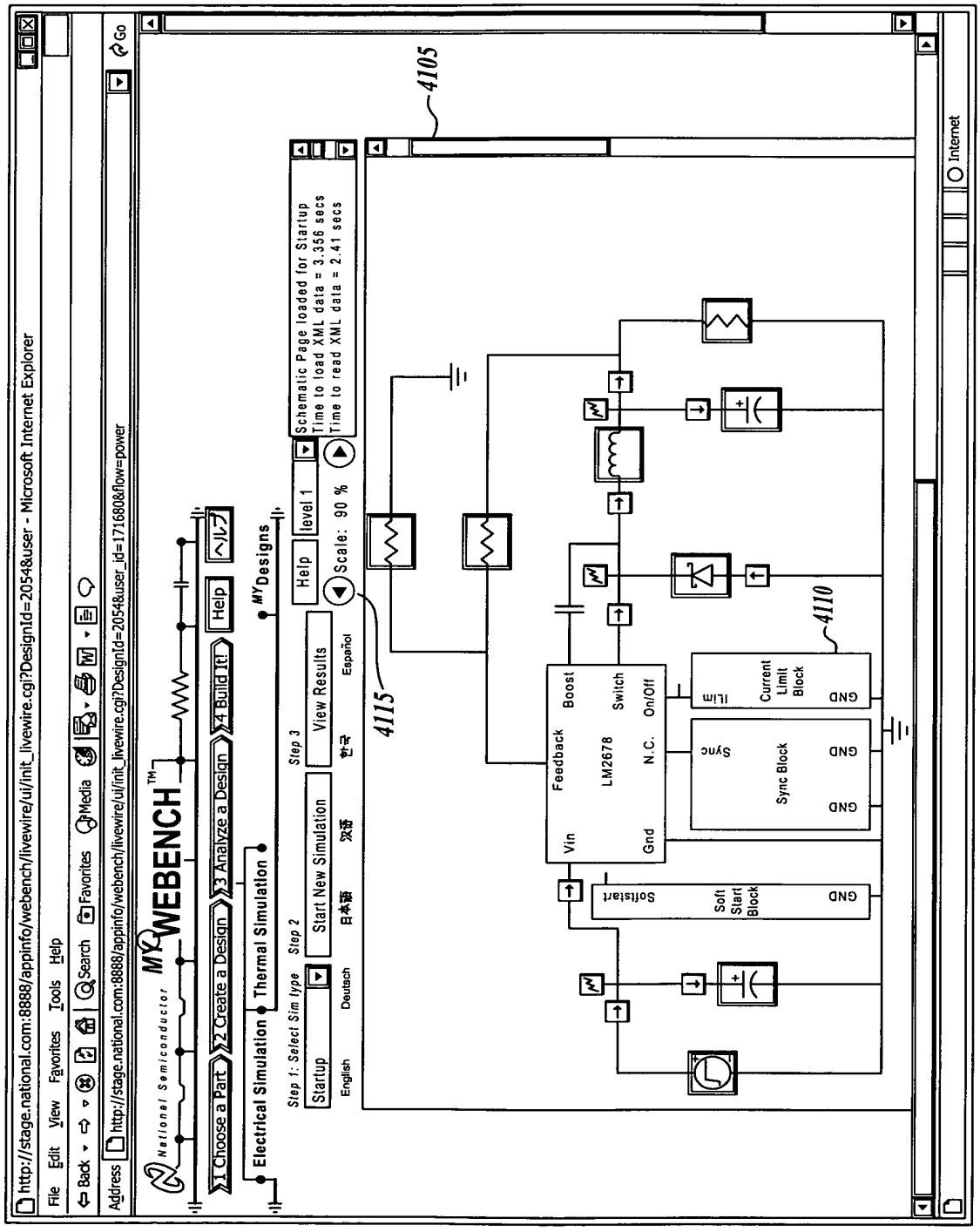
4100
4105
4110
4115
http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548&user - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548&user_id=1716808&flow=power
Go
National Semiconductor MY WEBENCH™
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
ヘルプ
Electrical Simulation
Thermal Simulation
MY Designs
Step 1: Select Sim type
Startup
English Deutsch 日本語 双语 한국 Español
Step 2
Start New Simulation
Step 3
View Results
Help
level 1
Scale: 90 %
Schematic Page loaded for Startup
Time to load XML data = 3.356 secs
Time to read XML data = 2.41 secs
Vin
Feedback
Boost
Switch
LM2678
N.C.
On/Off
Gnd
Sync
GND
Sync Block
ILIM
Current Limit Block
Softstart
Soft Start Block
Internet

Fig. 41

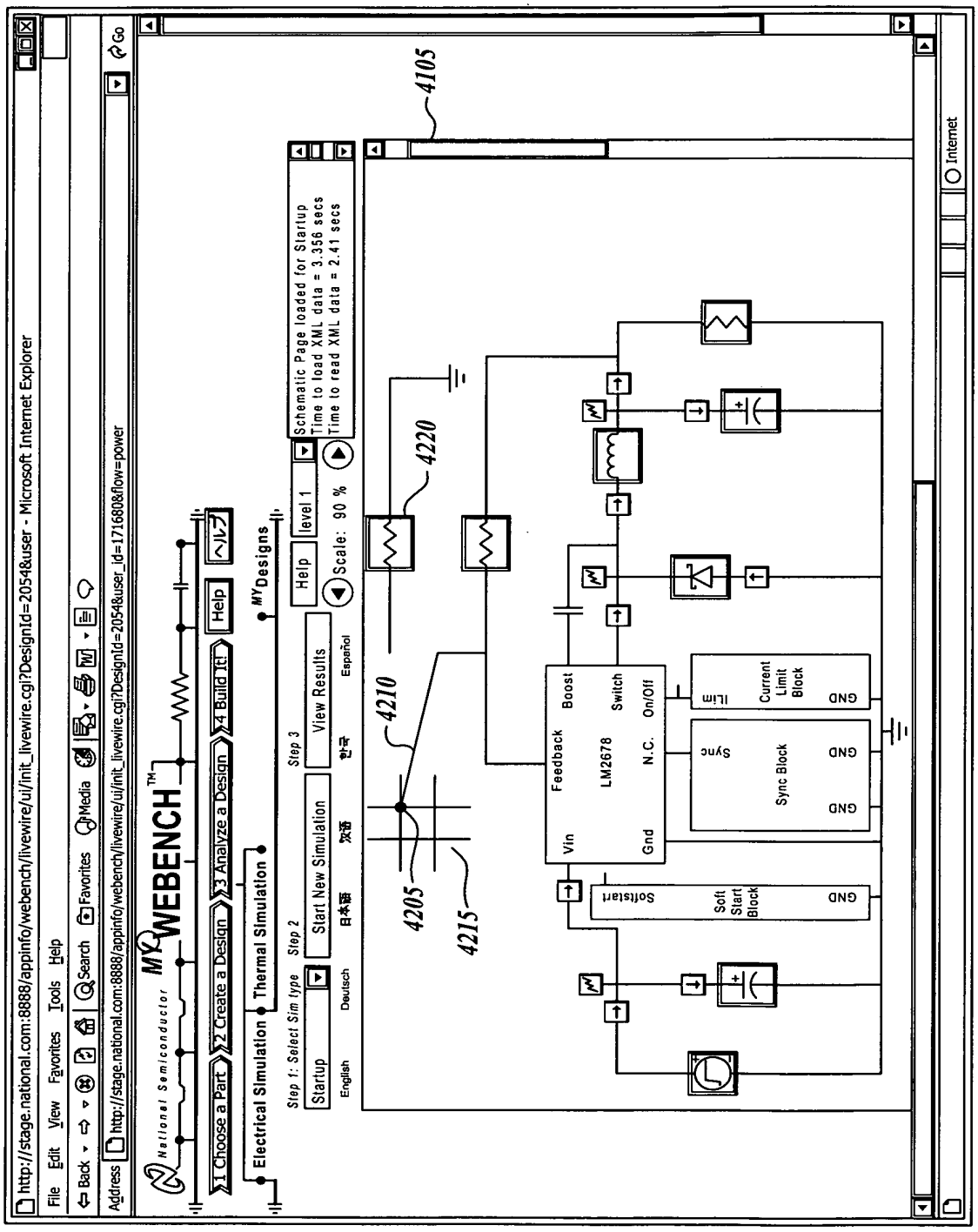
http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548user - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548user_id=1716808flow=power
National Semiconductor MY WEBENCH™
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
Electrical Simulation
Thermal Simulation
MY Designs
Step 1: Select Sim type
Startup
Step 2
Start New Simulation
Step 3
View Results
Help
level 1
Schematic Page loaded for Startup
Time to load XML data = 3.356 secs
Time to read XML data = 2.41 secs
Scale: 90 %
English Deutsch 日本語 繁体 한국 Español
4105
4220
4210
4205
4215
Vin
Feedback
Boost
Switch
On/Off
N.C.
Gnd
LM2678
Softstart
Soft Start Block
GND
Sync
Sync Block
ILim
Current Limit Block
Internet

Fig. 42

REPLACEMENT SHEET

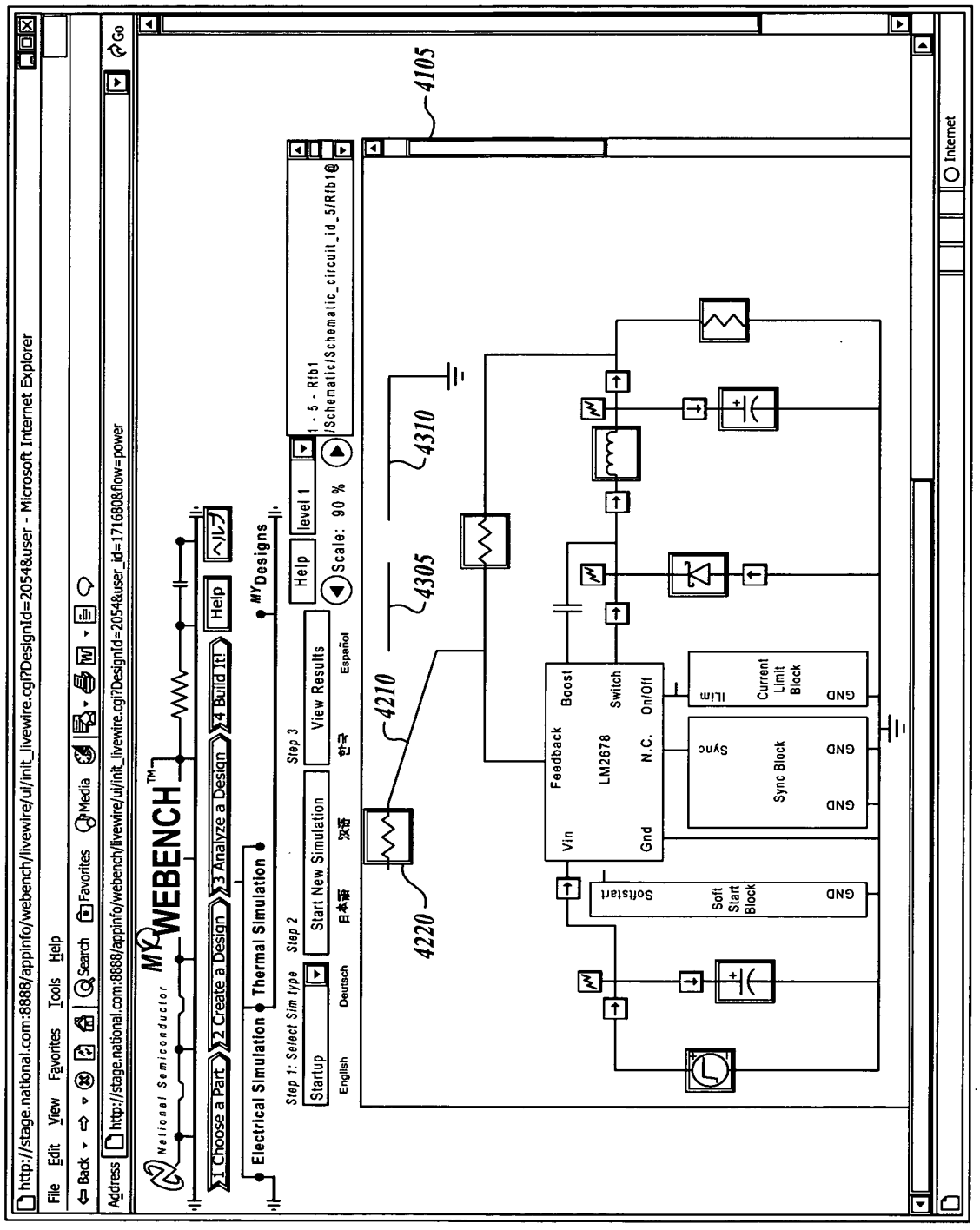

Fig. 43

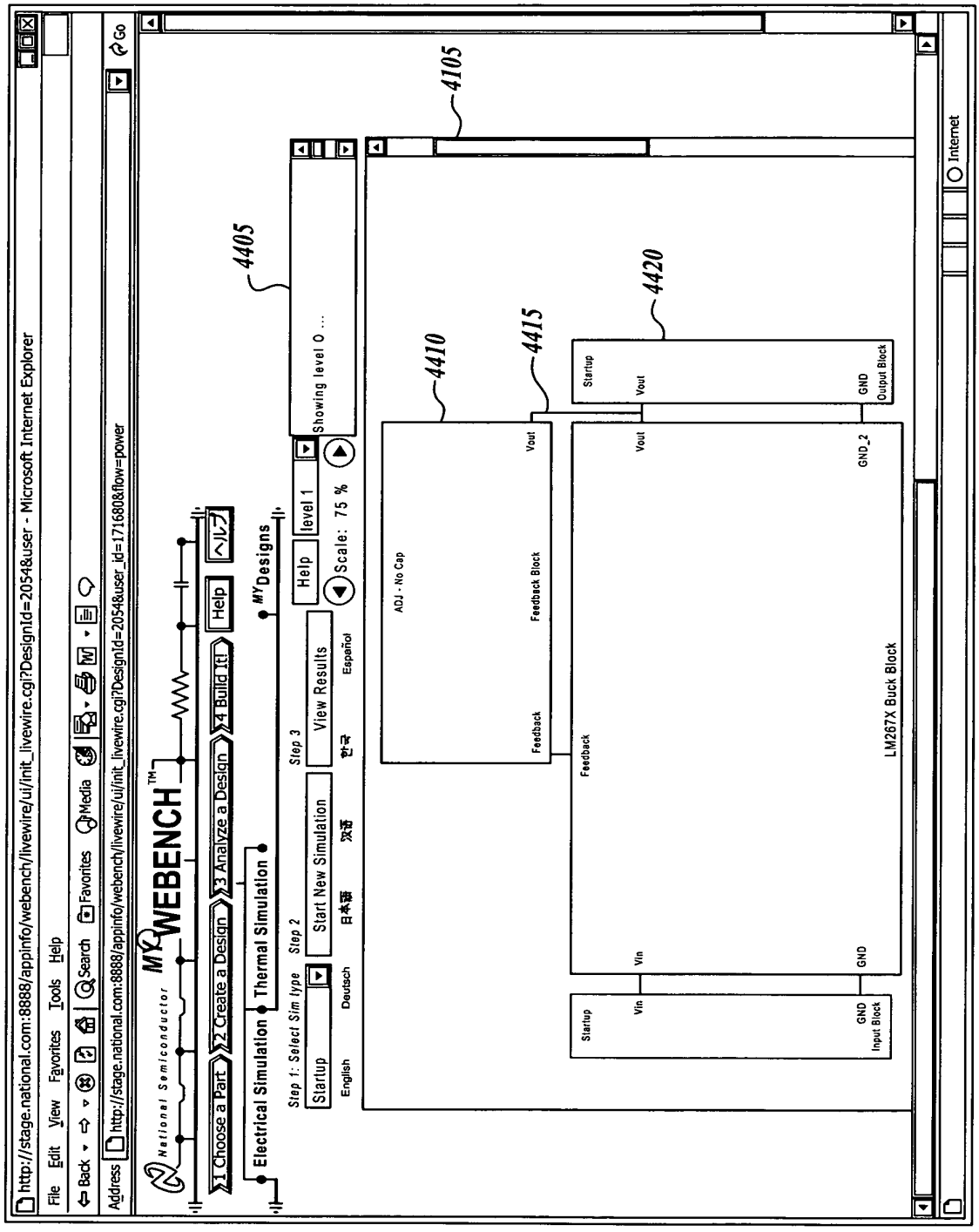
http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548user - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548user_id=1716808flow=power
Go
National Semiconductor MY WEBENCH™
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
ヘルプ
MY Designs
Electrical Simulation
Thermal Simulation
Step 1: Select Sim type
Startup
Step 2
Start New Simulation
Step 3
View Results
Help
level 1
Showing level 0 ...
Scale: 75 %
English Deutsch 日本語 汉语 한국 Español
4105
4405
4410
4415
4420
ADJ - No Cap
Feedback
Feedback Block
Vout
Startup
Vout
GND
Output Block
Feedback
Vout
GND_2
LM267X Buck Block
Startup
Vin
GND
Input Block
Vin
GND
Internet

Fig. 44

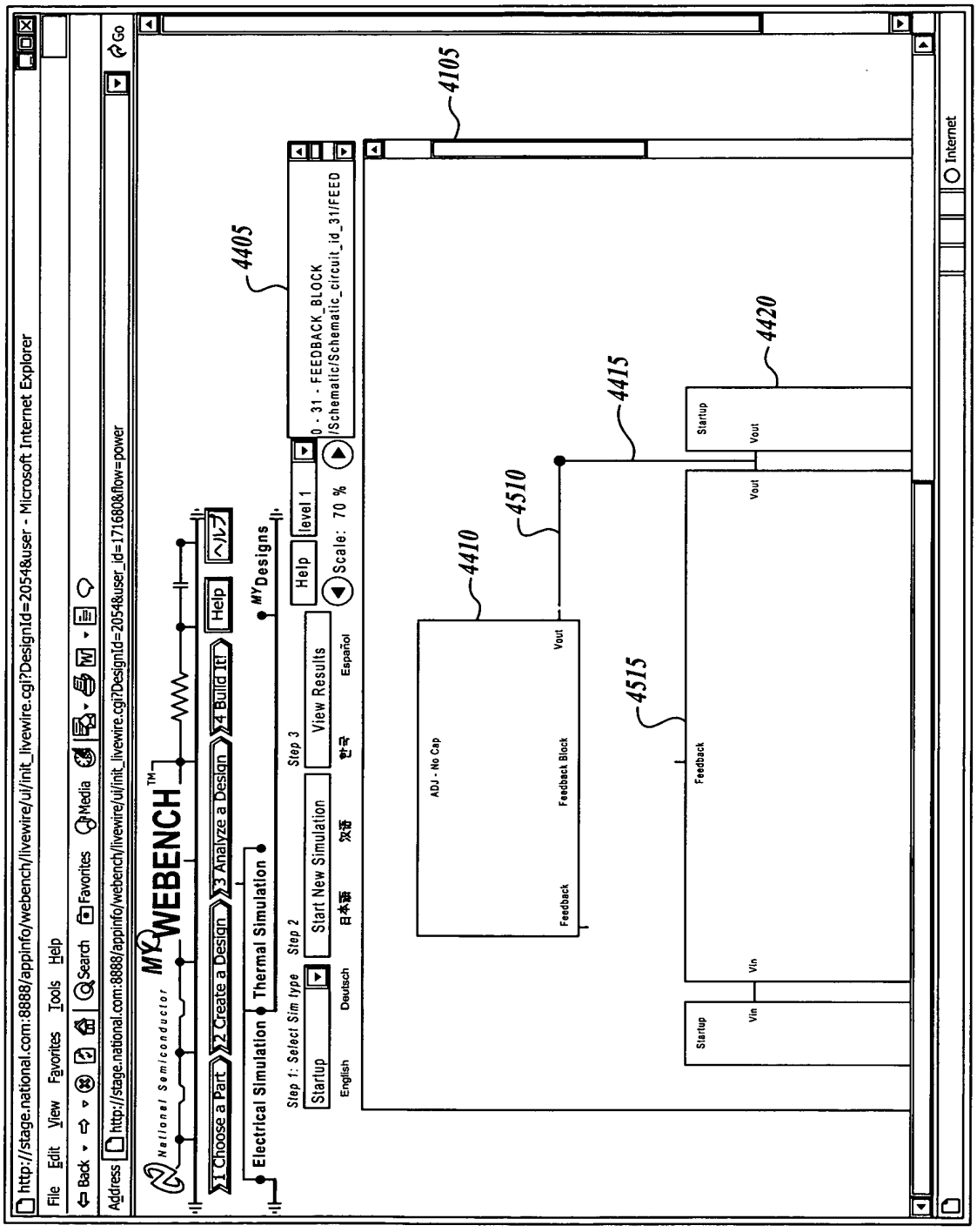
http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548user - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://stage.national.com:8888/appinfo/webench/livewire/ui/init_livewire.cgi?DesignId=20548user_id=1716808flow=power
National Semiconductor MY WEBENCH
1 Choose a Part
2 Create a Design
3 Analyze a Design
4 Build It!
Help
Electrical Simulation
Thermal Simulation
MY Designs
Step 1: Select Sim type
Step 2
Step 3
Startup
Start New Simulation
View Results
Help
Level 1
Scale: 70 %
English
Deutsch
日本語
Español
0 - 31 - FEEDBACK_BLOCK
/Schematic/Schematic_circuit_id_31/FEED
4105
4405
4410
4510
4415
4420
4515
ADJ - No Cap
Feedback
Feedback Block
Vout
Startup
Vin
Feedback
Vout
Internet

Fig. 45

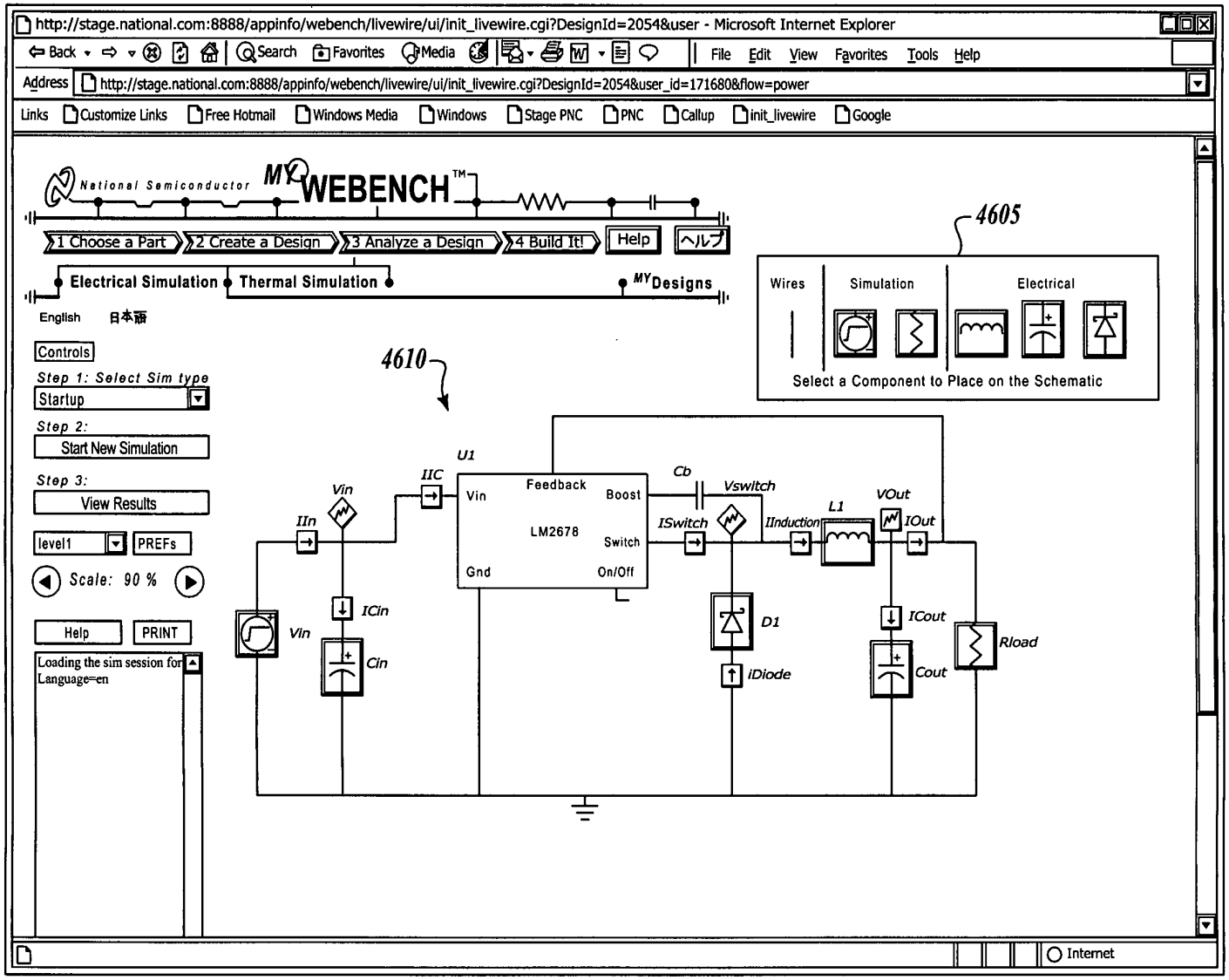

Fig. 46